CONSUMER PREFERENCES FOR WOOL PRODUCTION ATTRIBUTES

by

YUN-JU (KELLY) CHEN

B.S., National Chung Hsing University, 2001
M.S., Kansas State University, 2003

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Agricultural Economics
College of Agriculture

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2008

Abstract

The U.S. wool demand has declined since 1950s due to the increasing demand for synthetic fibers. This research aims to study U.S. consumers' preferences for wool attributes to help the wool industry developing marketing strategies targeting certain groups of consumers. This research can be divided into two parts: 1) examining consumers' willingness-to-pay for wool attributes including country-of-origin, organic, animal-friendly, environment-friendly, and 2) investigating whether or not the consumer segments can be identified from consumers' demographic and psychographic characteristics on product purchasing behavior with respect to the wool attributes.

In order to achieve the purpose of this research, the choice experiment was applied to examine consumers' preferences for wool attributes. Both mail and on-line surveys were conducted. The mail survey included three versions: basic version, version with definitions of attributes, and version with both definitions and information about wool attributes, with ## responses received (a 29 percent response rate). The on-line survey contained the basic version and the version with both definitions and information about wool attributes, with 514 responses received. Conditional logit and multinomial logit models were used to examine willingness-to-pay for wool attributes and consumer segments, respectively.

Results indicated that a certain portion of U.S. consumers preferred wool over acrylic products. Findings also suggested that it is likely beneficial for wool producers to differentiate their products by promoting products' attributes, such as organic, animal-friendly, and environment-friendly. Further, brief information on product attributes provided with labels

could increase consumers' WTPs. Results here revealed that to increase wool producers' revenues effectively, it is necessary to advertise their value-added wool products to different consumer segments.

CONSUMER PREFERENCES FOR WOOL PRODUCTION ATTRIBUTES

by

YUN-JU (KELLY) CHEN

B.S., National Chung Hsing University, 2001
M.S., Kansas State University, 2003

A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Agricultural Economics
College of Agriculture

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2008

Approved by:

Major Professor
Hikaru Hanawa Peterson

Copyright

Abstract

The U.S. wool demand has declined since 1950s due to the increasing demand for synthetic fibers. This research aims to study U.S. consumers' preferences for wool attributes to help the wool industry developing marketing strategies targeting certain groups of consumers. This research can be divided into two parts: 1) examining consumers' willingness-to-pay for wool attributes including country-of-origin, organic, animal-friendly, environment-friendly, and 2) investigating whether or not the consumer segments can be identified from consumers' demographic and psychographic characteristics on product purchasing behavior with respect to the wool attributes.

In order to achieve the purpose of this research, the choice experiment was applied to examine consumers' preferences for wool attributes. Both mail and on-line surveys were conducted. The mail survey included three versions: basic version, version with definitions of attributes, and version with both definitions and information about wool attributes, with ## responses received (a 29 percent response rate). The on-line survey contained the basic version and the version with both definitions and information about wool attributes, with 514 responses received. Conditional logit and multinomial logit models were used to examine willingness-to-pay for wool attributes and consumer segments, respectively.

Results indicated that a certain portion of U.S. consumers preferred wool over acrylic products. Findings also suggested that it is likely beneficial for wool producers to differentiate their products by promoting products' attributes, such as organic, animal-friendly, and environment-friendly. Further, brief information on product attributes provided with labels could increase consumers' WTPs. Results here revealed that to increase wool producers'

revenues effectively, it is necessary to advertise their value-added wool products to different consumer segments.

Table of Contents

List of Figures

List of Tables

Acknowledgements

I would like to express my appreciation to several people who have helped me complete this degree. First, I would like to thank my major advisor, Dr. Hikaru Peterson, for her guidance and assistance throughout graduate school. Second, I extend my special thanks Dr. Gwendolyn Hustvedt for her ideas for this research and inspiration. Third, I would like to give my gratitude to the committee members, Dr. Andrew Barkley, Dr. Yang-Ming Chang, Dr. Sean Fox, and Dr. Sherry J Haar for their suggestion and comments. Credits and special thanks go to my colleagues, Dr. Ya Ding and Dr. Zhifeng Gao for sharing econometric knowledge for this research. Also, I thank you my colleagues Kara Ross and Jeri Stroade for their assistance in writing. Encouragements from other colleagues, Dr. Monica Andreu, Dr. Alexandra Gregory, Dr. Percy Manzo, Mohan Metla, Dr. Dustin Pendell, Dr. Glynn Tonsor, and Sreedhar Upendram are appreciated.

Other thanks to Mr. Tim Lim, Mr. Joe Tiao, and other Taiwanese friends, Jenny Wu and others for their support and kind assistance during these years. Finally, I want to thank my parents, brother, and uncles for their financial support, encouragement, and advice for pursuing this degree and living in the United States.

CHAPTER 1 - Introduction and Background

1.1 Introduction

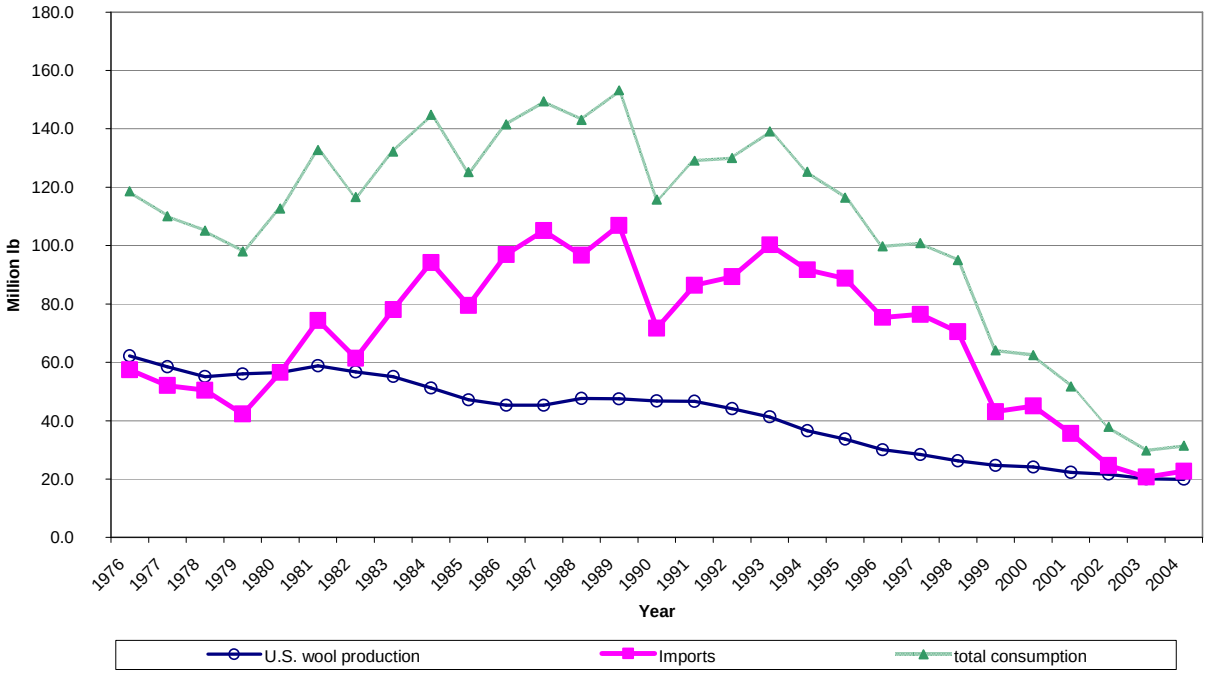
Wool has long been part of the civilization. Wool clothing was first made in 1500 B.C. Wool was once the England's major export during the Middle Age. The Industrial Revolution that took place in the late 18th century brought large demand for fiber, including wool, and activated the international textile trade (Woolmark Company). Then, invention of artificial textile in the 1950s has driven the demand for wool down, affecting the wool industry worldwide.

The U.S. wool industry in particular has been on the decline over the recent years. Figure 1.1 shows such a trend in U.S. wool production since 1976. The production of grease wool declined 64 percent from 1976 to 2004, and the rate of decline was 68 percent for clean wool production during the same period. Wool can be viewed as a byproduct of producing lamb meat, but U.S. sheep production has not supplied the domestic consumption level of lamb. Indeed, U.S. imports about 26 percent of its lamb consumption, with Australia accounting for 66 percent and New Zealand for 34 percent of imports in 2003 (Clemens and Babcock, 2004). In addition, according to the U.S. Bureau of the Census, U.S. total raw wool consumption dropped 72 percent from 1994 to 2002.

Another issue in the U.S. wool industry is the subsidy. During World War II, the military planners found the U.S. wool could only supply half the wool needed by the military, leading to the National Wool Act in 1954 to subsidize U.S. wool producers. Under the Wool Act, U.S. wool growers were paid 127 percent of wool sold in the market in 1990. However, it was argued that the subsidies did not help small U.S. wool producers, because 72 percent of the

government's subsidies were being received by 10 percent of the wool farmers (Environmental Working Group's Farm Subsidy Database). Furthermore, half of these 10 percent of the wool growers were corporate wool producers. According to some reports, 60 percent of U.S. wool growers did not receive help at all (Environmental Working Group's Farm Subsidy Database). The program was terminated in 1996 as the result of the Congress in 1993 (Summary and Evolution of U. S. Farm Bill Commodity Titles).

Figure 1.1 U.S. Clean Wool Production, Imports, and Consumption in U.S. (1976-2004)

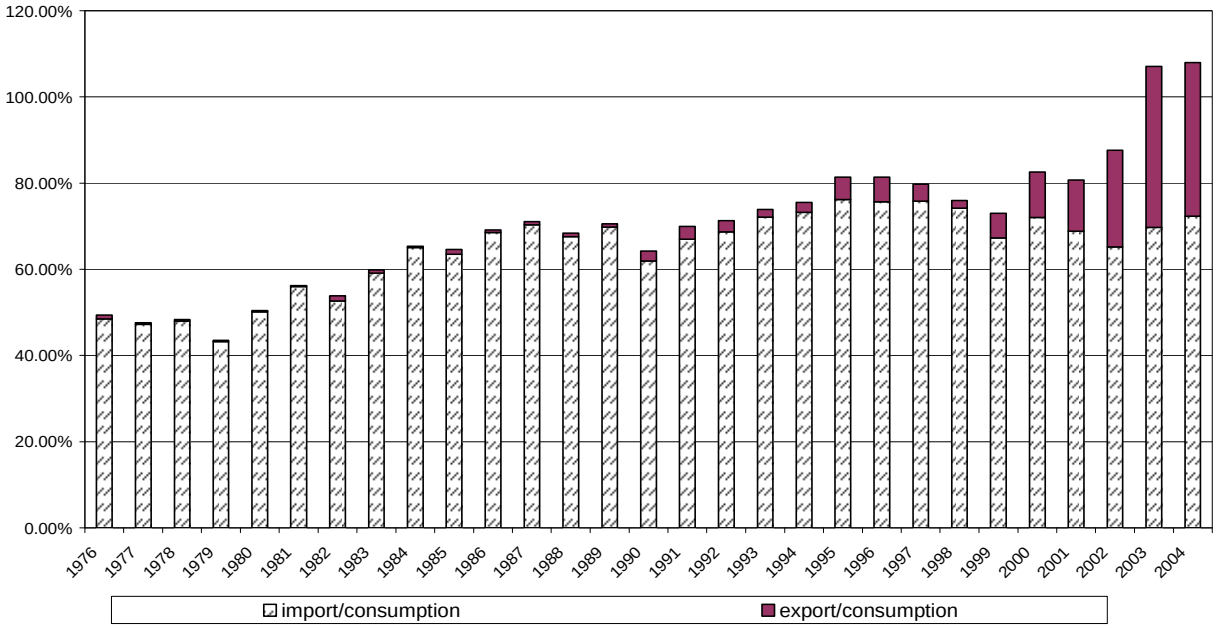


Source: National Agricultural Statistics Service

Market globalization has allowed commodities from different countries to compete with one another. The share of imports in U.S. wool consumption had increased from 48 percent to 72 percent from 1976 to 2004 (Figure 1.2). According to the American Sheep Industry Association, U.S. textile mills used nearly all of the domestic wool production until 2000. As the import quotas for countries such as China were gradually removed by January 2005, many mills have

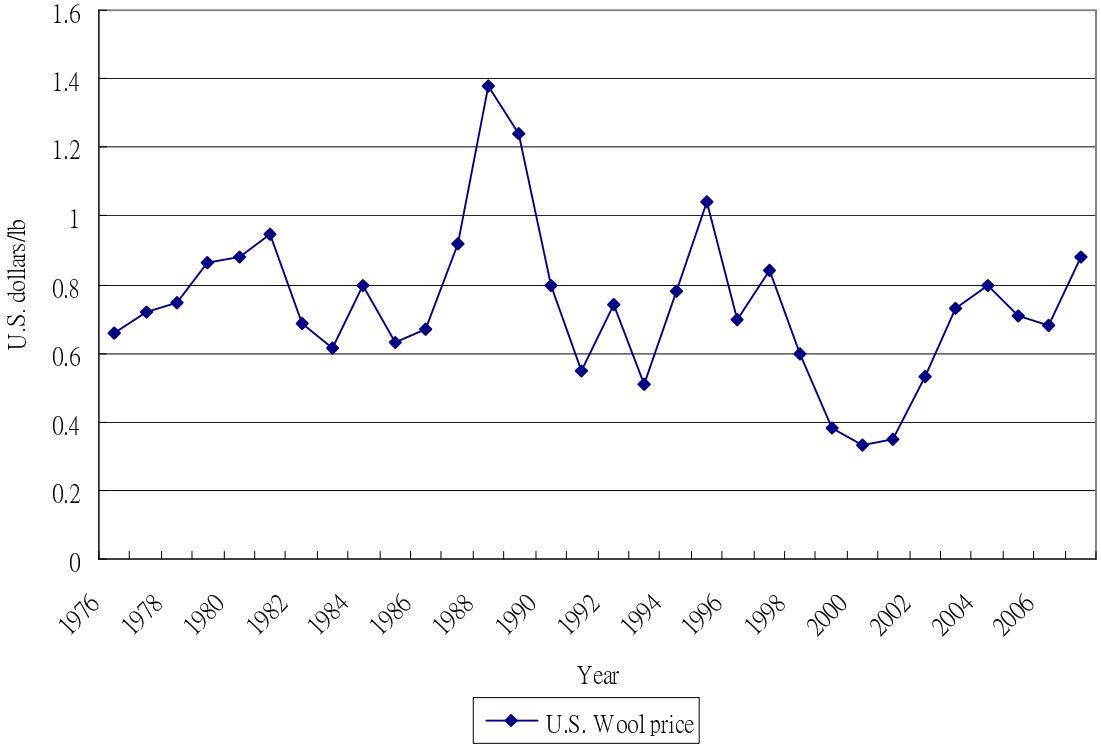
either closed or moved their production facilities to other countries (American Sheep Industry Association). It was predicted that over 1,300 textile plants would close during 2004 to 2006 (The American Textile Manufacturers Institute). In addition, the U.S. wool price has dropped 36 percent since 1998 in real terms (Figure 1.3). Thus, it is important to help enhance the value of output for the U.S. wool producers.

Figure 1.2 Percentage for U.S. Wool Import and Export



Sources: The U.S. Bureau of Census and U.S. Department of Agriculture

Figure 1.3 U.S. Wool Price, 1976-2007



Source: National Agricultural Statistics Service

To help regain the U.S. wool's market share in the domestic market, it is necessary to identify and promote attributes of U.S. wool that would set it apart from imported wool and are desired by consumers. Most conventional wool products we see in the market have been processed using chemicals, and evidence has shown that some chemical wool treatments are poisonous to both human health and the environment (Organic Trade Association). Thus, marketing chemical-free wool products is one potential venue, and organic wool has created a niche market for wool growers since the 1950s with increased public awareness towards health and environmental issues. Organic wool products already can be found in baby clothes, blankets, coats, knitting yarn, socks, sweaters, throws, and furniture. While the popularity of

organic wool has been on the rise, supply of organic wool remains limited in supply, and much of it is imported from New Zealand and Australia (Speer, 2006).

The industry may also encourage consumers' preferences towards animal-friendly products. For example, Australia, the largest wool importing country for U.S., has negative reputation on the way they treated their sheep during the production process and exporting. For example, live export and mulesing (see *Animal Welfare* section for detail) practices have been associated with cruelty to sheep (SaveTheSheep.com). On the contrary, mulesing is not a practice that is utilized in the U.S., and U.S. does not export live sheep on boats to other countries (Samuelson, 2006). Moreover, the U.S. sheep industry has recognized the ethical responsibility for the humane care of animals and instituted the Sheep Safety & Quality Assurance Program in the late 1980s. However, the current organic standards include regulations that are at odds with humane treatments of sheep in the U.S. The qualifications relative to animal for organic food production only regulate the usage of antibiotics or growth hormones, but the treatments on animals (e.g., medication for avoiding diseased and pain). With anecdotal evidence that U.S. wool producers are hesitant to adopt organic methods under the current regulation, the need to revisit the current regulation should be assessed.

To date, there are no regulations in the U.S. that consider the farm animal rights.[1] Producing and marketing organic wool according to certain standards regarding animal welfare could have the potential to benefit both current and new joined organic sheep farmers if consumers are willing to recognize and pay for such product attributes. Furthermore, it is

[1] Farm Animals are regulated under the Animal Welfare Act (AWA) only when used in biomedical research, testing, teaching and exhibition. Farm animals used for food and fiber or for food and fiber research are not regulated under the AWA (Animal Information Center).

currently not possible for consumers to tell from where the wool used in their apparels originate. The regulated animal welfare labeling system can help consumers who care about animal welfare to be able to purchase the animal products that considered animal welfare. Since U.S. wool does not have negative reputation on sheep humanity as Australia, the certified animal-friendly label should be able to increase the attractiveness of U.S. wool. Results from this dissertation can provide U.S. producers directions to increase their values of output in the domestic market, and maybe expand its market share in the world wool market in the future. Recent developments and trends in consumers' behaviors and preferences toward products that are organic, environment-friendly, locally grown, and animal-friendly support the possible impacts of this dissertation finding as discussed in the following sub-sections.

1.1.1 Organic and Environment-Friendly Fiber

Agricultural products that are not genetically modified, do not use most synthetic chemical inputs during productions processes can be classified as organic products. The USDA regulates the chemicals that are approved to use for producing and processing of organic products and publishes the National List of Allowed and Prohibited Substances. Organic food has drawn public attention due to the increasing health concern during the last decades, as consumers view organic food as healthier than conventional alternative (Beharrel and MacFie, 1991).

Sirieix and Schaer (1999) summarized that motivations of buying organic food are environmental concerns (Dufour and Loisel, 1996) and health-related determinants (Robert-Kréziak, 1998). Products' environmental attributes have become more and more important to consumers according to the U.S. Environmental Protection Agency (1994) (cited in Teisl and

Roe, 2005). Teisl and Roe (2005) claimed that consumers were willing to pay more for the environmentally benign commodities even though the development of such market had been slow due to the current environmental labeling regulations. The well-designed environmental labeling can make consumers' and producers' behaviors different (Teisl et al., 2002; Bjørner et al., 2004). Yet, Grunert (1991) and Grunert and Juhl (1995) concluded that there were almost no relationships between consumers' environmental concerns and food purchasing (cited in Sirieix and Schaer, 1999).

Organic consumption has expanded to the non-food market including apparel. For instance, California Certified Organic Farmers and Texas Organic Cotton Cooperative certify organic cotton farmers allowing firms to sell apparel made from their cotton marketed as organic. U.S. organic cotton has received 18 to 50 percent price premium in 2004, while a 10 to 15 percent premium was noted for Australian organic wool products (Courtney, 2005; Wedel, 2005). Reflecting consumers' consideration towards health and environment, organic fabrics seem to be a growing sector in the textile market, recording a 22.7 percent annual growth for 2003 (Organic Trade Association, 2004). People have similarly shown interest in organic apparel, especially for young children, because some evidences had shown that the chemical residual could cause adverse health influences (Nimon and Beghin, 1999). For example, the Organic Trade Association (2006) reported that organic women's clothing sales grew by 33.6 percent and 20.5 percent for infant's clothing in 2003. It was predicted that U.S. sales of organic fiber would have an average of 15.5 percent growth rate each year from 2004 through 2008 (Organic Trade Association, 2006).

Although organic wool products are not as well known as organic food or organic cotton yet, wealthy eco-consumers and people with allergies problems are likely willing to reward the

organic fabric producers for green practices. Today, organic wool can be seen in baby clothes, blankets, coats, knitting yarn, socks, sweaters, and throws. Some well-known apparel brands such as Nike, Timberland, and Patagonia have provided organic fabric options for consumers.

In addition to the apparel market, organic wool has seen new demand in the furniture and bedding market, for instance Ecobaby Organic. Ecobaby is a U.S. company that sells organic diapers, clothing, cotton and/or wool stuffed toys, bath and bedding for baby, and adult bedding. They promote their mattresses meet the 2005 California/Federal fire flammability standards and without using polybrominated diphenyl ethers (PDBE), which is fire retardant banned in Europe but is still used in the U.S. Studies have shown that body stores chemicals found in mattresses in fatty tissue through skin and lung, and some PDBEs have been linked to problems in brain development and thyroid hormones. Wool has character of low-flammability, thus, it is often used to replace fire retardant chemical treated materials in mattresses, futons, and chairs.

Without a doubt, organic wool has a certain degree of demand, but cost of producing organic wool is higher than conventional wool. To ensure the purity and quality of organic fabrics, the Soil Association in the United Kingdom has developed textile standards. Similarly, in order to be certified as organic wool in the U.S., the wool products have to satisfy the federal standards for organic livestock production: 1) Livestock feed and forage used from the last third of gestation on must be organic; 2) Use of hormones or synthetic hormones and genetic engineering is prohibited; 3) Use of synthetic pesticides (internal, external and on pastures) is prohibited; 4) Producers must encourage livestock health through good cultural and management practices (Gaines, 2004). The additional certification cost and the difficulty for organic wool farmers to achieve economies of scale in part explain the higher cost. However, if consumers acknowledge the possible health threats from using chemical treated fibers and willing to pay

more for organic fiber products, it may offset the extra cost for producing organic wool. Even more, premium for organic wool may be sufficient to increase profits for producers. Therefore, the market for organic apparel resource is worth investigating for sheep producers.

Based on the estimate of the Organic Trade Association, 18,852 pounds of organic shorn wool were produced in New Mexico, Montana, Maine, Colorado, Vermont, and New Jersey (in the order of amount organic wool was produced) in 2005, which comprised 0.05 percent of U.S. shorn wool production (Agricultural Marketing Resource Center). Compared with the most organic wool producers in the eastern U.S., the west region producers have more advantages for producing organic wool due to drier weather and bigger pastures. For example, New Mexico accounted for about 81 percent of organic wool produced in 2005. In addition, Organic Trade Association's survey showed Columbia, Navajo-Churro, Rambouillet, Rambouillet/Suffolk Cross as the main breeds of sheep which produced organic wool in the U.S.

Overall, the U.S. organic food and beverage sales have grown significantly from 1990 to 2007 reaching $19 billion, and are predicted to reach $23.6 billion in 2008. Furthermore, the total U.S. organic sales (including food and non-food products) grew 21 percent from 2005 to 2006 (Organic Trade Association). While the 2006 sales of organic food and beverage products represented 2.8 percent of total U.S. food and beverage sales, the growth rate in 2006 remained high at 20.9 percent (26 percent for non-food organic products). Considering the increasing public awareness of organic products, the continuous expansion of this market segment can be expected. Despite the small market share of the organics, its remarkable growth justifies further research on this sector.

1.1.2 Locally Grown Products

Although globalization is the main trend in the economy, regional consumption remains widely discussed. Consumers seem interested in purchasing products from certain countries of origin (COO) and locally grown products. For example, Loureiro and Hine (2001) found that Colorado consumers were willing to pay more for "Colorado Grown" potatoes, and Clemens and Babcock (2004) found that New Zealand lamb had taken advantage of COO labeling in the international markets. Producers or government can implement marketing schemes on local products appropriately labeled to improve the local economy and boost the regional agriculture (Giraud and Bond, 2001). Findings in Brooker and Eastwood's (1989) research showed that consumers were willing to pay price premiums to offset labeling cost on the state-grown tomatoes. A later study completed by Govindasamy, Italia, and Thatch (1999) also found that consumers in New Jersey were willing to pay more for state-grown fresh products.

U.S. wool production has not equaled the domestic consumption since 1976 (Figure 1.1). The same figure shows the dependence of U.S. wool consumption on imports, suggesting a room for domestic producers to expand their share in the U.S. market. The U.S. domestic organic wool supply also does not meet the domestic demand. Australian and New Zealand organic wool are the two main importing sources to meet the U.S. domestic demand (Gaines, 2004). Matt Mole, president and owner of Vermont Organic Fiber Company in Burlington, VT, stated that he would prefer to buy organic wool domestically, if there were enough supply. Moreover, he expected the organic wool market will grow, and he will be willing to buy up to 250,000 pounds of U.S. organic wool in four to five years, which is five times his current purchase (Gaines, 2004).

1.1.3 Animal Welfare

Because of technological improvement, utilization of genetic engineering, and more efficient farm management, cost for agricultural production has been decreasing. As a result, food expenditures have steadily decreased worldwide until the recent surge in 2008 as this dissertation was being completed. However, cheaper food may indicate greater pain for animals consumed as human food (Appleby, 2005). Farm Animal Welfare Council (FAWC), which was founded by the government of the United Kingdom in 1979, defined that animal welfare should include both physical and mental conditions. Moreover, good animal welfare implies both fitness and a sense of well-being, and animals must be protected from unnecessary suffering (FAWC, 2006). FAWC also listed five freedoms as a comprehensive guidelines for animal welfare in the livestock industry: 1) freedom from hunger and thirst - fresh water and food are provided to maintain animal health; 2) freedom from discomfort - comfortable environment such as shelter and resting area should be provided; 3) freedom from pain, injury or disease - timely prevention, diagnosis, and treatment need to be provided ; 4) freedom to express normal behavior - by providing space, proper facilities and company, and 5) freedom from fear and distress - appropriate treatment to avoid mental suffering.

As the public awareness towards animal welfare has increased, the relationship between increasing animal welfare and increased products prices has been debated. Appleby (2005) studied the connection between food prices and animal welfare and argued that improvement in animal welfare could both increase and decreased production costs. Farmers could have increased production costs because of increasing space allowances for livestock, or decreased their production costs by reducing disease infection and mortality. Consumers' demand for cheaper food may drive producers to seek methods that can lower production costs. However,

McInerney (1998) stated that only a small raise in the price paid by consumers could improve animal welfare on farms (cited in Appleby, 2005). For example, cost for higher broilers' welfare only increased the cost at the farm level by five percent both for reducing broiler stocking density and slowing broiler growth (SCAHAW, 2000), while the cost of animal products only accounted for five percent of prices that consumers paid at restaurants or supermarkets (Appleby, 2005). Moreover, the existence of a certain proportion of consumers and retailers who expect producers to safeguard animal welfare has been noted in the U.S. (Appleby, 2004). Therefore, a niche market for consumers who regard effects of conventional production practice on animal welfare and environment can help farmers offset their increased production costs of improving animal welfare. The author concluded that free-market competition should no longer be the only solution for selection of production methods and determination of food prices.

Therefore, animal welfare could be another feature that the U.S. wool industry could use to market their output. Public opinion towards animal welfare improvement has increased animal scientific research, consumer activity, and political response in the European Union (EU) in the last fifteen to twenty years (Moynagh, 2000). The Scientific Committee on Animal Health and Animal Welfare (SCAHAW) plays an important role regarding animal welfare regulations in the EU. SCAHAW uses animal health, production, and, physiology as indicators for animal welfare. Issues on animal welfare also have implications on international trade. For instance, the EU banned furs from countries where animals were caught for furs by leg-hold traps. Further, European consumers were willing to pay a price premium for free-range chicken. Moynagh (2000) showed that consumers in the EU were ready to pay three times more for free-range chicken than conventionally raised chicken, where the farm-gate costs only increase 5 to 10 percent for free-range chicken.

The U.S.-based People for the Ethical Treatment of Animals (PETA) founded in 1980, the largest animal rights organization in the world, focus on animal welfare of factory farms, laboratories, clothing trade, and entertainment industry areas. PETA had approached the Australian government and wool industry to improve sheep welfare in Australia. Mulesing is an important part of husbandry for Australian Merino sheep, where the skin around the breech is surgically removed to prevent fly strike caused by Australian blowfly (Lucilia Cuprina). Australian Wool and Sheep Industry Task-force (AWSIT) claimed that without mulesing, up to three million sheep would be killed in a year in the hot and wet conditions. Thus, AWSIT considered mulesing as a way to promote sheep's welfare.

For live-export, sheep are often shipped miles by sea in open-decked ships through scorching heat and freezing cold. PETA has claimed that although Australia had set up regulations (Australian Animal Welfare Strategy) for sheep welfare in May 2004, these standards were not well enforced. In order to caution the Australian government for abuses on sheep raised for wool, PETA has launched an international boycott of Australian wool, hoping to stop the arguably inhumane practices of live-export and mulesing. Some U.S. clothing companies have worked together with PETA to enhance animal welfare. For example, in 2005, U.S. retailers such as Gap, Inc., Liz Claiborne, Lands' End, LL Bean, Eddie Bauer, Jones Apparel Group, and Ann Taylor supported the agreement of ending sheep mulesing by 2010, which were agreed between PETA and the Australian Wool Growers Association (AWGA). By far, Australia is the biggest wool exporting country for the U.S. Therefore, if U.S. wool industry can impose higher standards for sheep's welfare, U.S. wool might be able to take market share away from the Australian industry.

1.2 Objectives

The overall objective of this dissertation is to explore possibilities for the U.S. wool industry to increase the value of its output in the marketplace by furthering the understanding for demand for wool in the U.S. Specifically, the objectives can be classified into two parts: 1) assessing U.S. demand for wool with various attributes by estimating U.S. consumers' WTPs, and 2) exploring whether consumer segments interested in various wool attributes can be identified from sociodemographic and psychographic variables. Each of the specific objectives is elaborated below:

Marketing success of any new product will highly depend on its acceptance (Dransfield et al., 2005). Organic food has accepted by the masses, and the organic food market has been growing over the last decades. In addition, public attention on animal welfare issues has grown in recent years. Based on previous research on organic products, human health, locally grown, animal welfare and environmental concerns are the three main factors that increase consumers' motivations for buying organic commodities (Loureiro and Hine, 2001; Makatouni, 2002; Dransfield et al., 2005). Thus, this research will also examine if awareness of these issues helps to increase U.S. consumers' willingness to buy organic wool and to justify a price premium for organic wool.

Organic wool products and regulations for organic wool certification already exist. However, the standards that explicitly regulate inhumane treatments of animals have not been developed yet. An animal-friendly labeling, distinct from the organic labeling, is another possibility for increasing consumption and consumers' willingness to pay for U.S. wool. For example, European countries have specific labels on animal products that represent such products are from animals that are raised humanely (Russell, Krarup, and Clark, 2005). Besides

knowing consumers' preferences to animal-friendly wool alone, it is also important to investigate if consumers view organic and animal-friendly attributes of wool products as complementary or substitutes. A labeling scheme that matches with consumer values more closely could benefit U.S. sheep producers in their competition with the two big wool producing countries of New Zealand and Australia.

In addition, COO and local brand for organic wool will also be examined in this study to see if regional labeling can also help to improve organic wool consumption in the United States. This research aims to provide the U.S. wool industry with a deeper understanding of the domestic consumers' preferences toward wool products with added attributes. With this information, the U.S. wool industry can develop new marketing strategies to target certain groups of consumers. Therefore, this part of research will investigate what are consumers' preferences and willingness-to-pay for wool products that are animal-friendly certified.

The second specific objective of this research is to examine whether consumer segments who would value various wool attributes can be identified from socio-demographic and psychographic characteristics. According to a 2005 market research done by the Natural Marketing Institute, 23 percent of U.S. adults were qualified as "lifestyles of health and sustainability" (LOHAS) consumers. The LOHAS consumers were found to be more interested in purchasing products that have environmental, social, and healthy lifestyle values (French and Rogers, 2005). Organic products were often considered not only good for human health, but also for environmental health. Therefore, organic or environment-friendly products have their potential to be favored by the LOHAS consumers. Instead of being marketed as organic, some products were marketed as environment-friendly. For instance, ZQue, a labeling system for merino wool in New Zealand, highlights the social and environmental responsibility of its

members' products. Knowing what type of consumers would be interested in a certain kind of attribute can help developing the marketing strategies targeting those consumer segments.

Even though, past research has found that a certain consumer segment were especially interested in buying products with organic or environmental attributes, a segment of consumer interested in animal-friendly attributes has not been studied yet.

In order to achieve the objectives, a survey that included a choice experiment was conducted by mailing and internet. Conditional logit model and multinomial logit model were used to analyze the survey responses to estimate WTPs for various wool attributes, and to determine characteristics of consumers interested in them.

The rest of this chapter provides background information on wool, where wool production, properties, and markets are discussed, as well as consumer trends in apparel shopping. Related literature is reviewed in Chapter two. The reviews includes studies on WTPs and consumer profiles for various products' attributes, such as organic, animal welfare, environmental concern, and locally grown. Chapter three explains how survey was designed and administered, and reports descriptive statistics of the responses. Chapter four discusses the models used for analyzing the responses. Estimated results for both models and from both the mail and on-line surveys are presented in the Chapter five, followed by conclusions and direction for future study on this topic in the Chapter six.

1.3 Background Information on Wool

The following section will provide some background information on wool processing and properties, wool markets (U.S., Australia, and world), and consumer trends (in organic fiber,

locally grown, animal welfare, and apparel shopping) to give a broad picture of wool industry and better understanding of the research issue.

1.3.1 Wool Production and Processing

The average life span of sheep is about 10 to 12 years. However, a ewe's productivity usually starts to decline after its seventh year. Therefore, the sheep farmers typically remove their sheep from the herd before they are 10 years old. In addition to wool, sheep provides meat, milk, and cheese. Sheep can be sheared when they reach approximately normal slaughter weight, which is 90 to 110 pounds for most breeds in the U.S., and sheep can be anywhere from about 5 to 12 months old. A sheep is usually shorn once per year, removing woolen fleece from the animal. Today, most of sheep are shorn by mechanical shears, and it may only take five minutes by a professional shearer. Commonwealth Scientific and Industrial Research Organization in Australia innovated a non-mechanical shearing method, BioclipTM, licensed to the Biological Wool Harvesting Company in 1997, where sheep is injected with the naturally occurring protein that let wool fleece break off and allowing it to be removed by hand. This method may help reduce the cut injuries and stress during the shearing process and increase the amount of quality wool harvested. However, the cost of using Bioclip has been about four to five U.S. dollars per head, compared to about two dollars per head by using mechanical shearing (Adams, 2003). Thus, this method has not been widely adopted.

Shorn fleece is skirted, where workers remove the less desirable parts of wool such as sweat tags. Skirted wool is rolled up to be classified by crimp (the more bends contained in the wool, the finer the crimp), strength, and color. Then, wool is baled separately by classified levels.

Greasy wool, wool that still contains dirt and grease, has to go through the following major steps to become yarns: The first step is called scouring, which is a process that washes away dust, sweat, and wool wax, producing clean wool. The second step is carding, which separates the stapled wool and laying the fibers in parallels to form a rope called a sliver. And then, combing, which separates short from long fibers, ensures that long fibers are laid in parallels to generate a combed sliver, which is called a top. Some tops are then drawn out into a unified thickness to thoroughly blend the wool and ensure evenness or regularity of the roving, which is unspun fiber that is long and narrow bundled prior to becoming worsted, or a yarn. Following this, the thicknesses of roving are reduced to fit spinning operations and evenness is improved in a step called finisher drawing. In the final step, called spinning, the roving is twisted and inserted together in order to generate finished yarns with strength. Yarns then could be woven or knitted into fabric, and then the fabrics were dyed, printed, finished into clothing or home furnishings.

Wool processing can have some negative environmental consequences. There are four major sources of pollutions: 1) pesticides, 2) dyeing, 3) shrink resistance, and 4) mothproofing. Wool growers use pesticides to help maintain health of their sheep, while the residues may pollute the environment during scouring. Even though all effluent from scouring is treated before discharged into rivers, some toxic pesticides such as lindane, have been sometimes found exceeded environmental quality standards (Woolmark Company). Lindane, also known as benzene hexachloride (BHC) and gamma-hexachlorocyclohexane (HCH), is a hard biodegradable and bioaccumulating toxic, which is banned in fifty-two countries and the state of California. However, it is still allowed in most European and low income countries. Lindane, similar to other agricultural pesticides, can be easily introduced to the environment and food

supply by water and rainfall. It can cause occasional flickering of the eyelid, blood disorders and children brain cancer, and is considered to be linked to both breast cancer and Parkinson's disease. It is no longer produced in the U.S. but is sold pharmaceutically.

Australia, New Zealand, South Africa and Uruguay have banned the use of toxic and persistent, organic chlorine insecticide and arsenic based pesticides, both of which are probably carcinogenic to human (Woolmark Company). Only biodegradable chemicals are allowed in these countries and used in a controlled way to minimize harmful residues (Woolmark Company).

As with other textiles, dyeing is an unavoidable process to produce fashion garments. However, some heavy metals, which do not break down in the nature, are used as dyeing material for wool (Woolmark Company). For example, dyes that contain chromium are applied widely in the wool industry due to the wide range of colors available at a relatively low cost. Particularly, there are no substitutes that can dye black and navy blue as well as chromium-containing dyes. Low chrome effluent dyeing techniques have been applied commercially, where the effluent meet the limitation of chromium residues. As an environmentally acceptable method, natural wool dyes, which used flowers, berries, roots, leaves and barks, has been received more public attention in recent years (Woolmark Company).

To prevent wool from shrinking, the outer scale layer of each wool fiber is chemically modified and covered by a thin layer of polymer. This process can produce high levels of harmful organohalogens, both from chlorine used in the pre-treatment stage and the chlorine-containing polymers. Research has shown that organohalogens could affect both thyroid and sex hormones. Most countries have regulations that limit the organohalogens contained in the effluent. The German government regulates the level of organohalogens contained in the

effluent in all industries. Chlorine usage in the United Kingdom requires license to operate. In Australia, low or zero organhalogens polymers are available for commercial use, and the pre-treatment alternatives to chlorine are under development.

Lastly, mothproofing is an important permanent treatment for wool carpet. Because wool contains protein, it is favored by some moths and beetles. Although chemicals that are used for mothproofing on wool carpets are safe to the environment under certain percentage, investigation has found that some conventional mothproofing methods may exceed the permitted discharge concentrations (Woolmark Company). Dieldrin used for wool carpet's mothproofing has been considered as a possible link to breast cancer.

1.3.2 Wool Properties

Wool accounted for 2.1 percent of world textile usage in 2004 (Woolmark Company). As general attire became more informal and people have come to seek more convenience in caring for clothing, wool demand has decreased and shifted towards high quality synthetic fibers over recent decades, as seen in section 1.1. For example, U.S. total raw wool consumption dropped 72 percent from 1994 to 2002 alone (U.S. Bureau of the Census). Yet, wool has unique and desirable properties which have been sought after by people for hundred years: 1) wool insulates against heat and cold; 2) wool is water repellent; 3) wool is fire resistant; 4) wool is naturally elastic; 5) wool wears longer; 6) wool is versatile; 7) wool resists static; 8) wool insulates against noise; 9) wool resists dirt; and 10) wool is fashionable (Australian Wool Services Limited).

Wool is well known for insulating against cold, but relatively fewer people know that it can also provide comfort in the hot weather. Wool can absorb about 30 percent of its own weight in

moisture before it becomes damp to feel. As moisture is absorbed, heat is generated to keep the wool warm. Therefore, wool is an ideal textile to wear after working strenuously or playing sport as it let the body to cool down slowly. Also, the wool crimps allow air to be in between each wool fibers, and this makes wool as a good insulator in both cold and hot weather.

At the same time, wool absorbs moisture, it repels liquids. Outside the wool fiber, the scales cause liquid to roll off the surface of the wool fabric. As a result, wool garment can help to keep dry when caught in a rain. Wool is naturally non-flammable and does not melt when burned. For this reason, wool garment can protect body from serious burns when accidents associated with fire happened. Due to this attribute, firemen's uniform is made of wool. Wool can be extended by about 30 percent when dry and stretched between 60 and 70 percent when wet, offering freedom of movement for active wear.

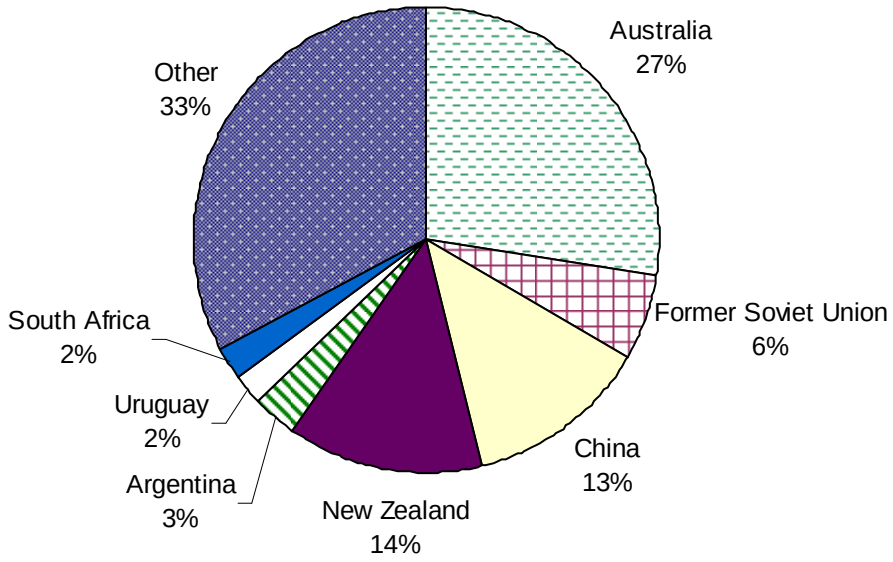
Wool can be worn for longer than its synthetic counterparts and keeps its appearance. Moreover, wool can resist static and dirt, and insulate noise. Coarser wool's durability and strength make it ideal for furnishings materials and carpets. Wool is versatile being used to produce coats, furnishing material, suits, blankets, underwear, curtains, skiwear, wall paper, and tennis ball coverings by blending varied kinds of wool in different methods.

1.3.3 The World Wool Market

China had the largest number of sheep during 2003 with 146 million heads, followed by Australia (94 millions) and the former Soviet Union (53 millions). However, Australia and New Zealand were the largest and the second largest wool producing countries (Figure 1.4), producing 745 and 370 million pounds of clean wool in 2003/04, respectively, followed by China with 346

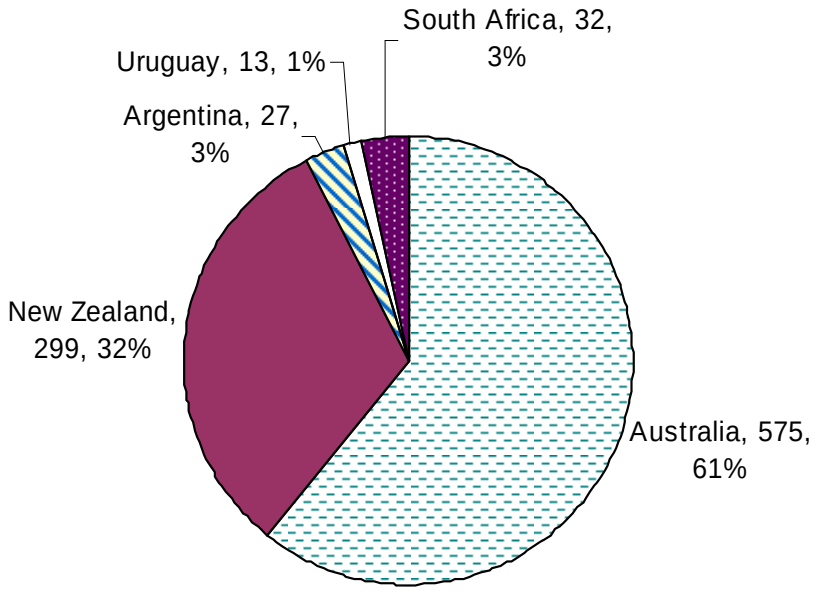
million pounds wool production. Moreover, Australia was the largest wool exporting country, accounting for 45 percent of the world greasy wool exports during 2002, followed by New Zealand. Figure 1.6 shows the clean wool exports in 2003/04. On the wool importing side, China imported the most cleaned wool (424 million pounds in 2002), followed by Italy, and United Kingdom (USDA, 2005). In addition, about 58.6 percent of greasy wool can be processed into clean wool, during 1990/91 to 2004/05 (International Wool Textile Organization).

Figure 1.4 Clean Wool Production, Million Pounds, 2003/04



Source: International Wool Textile Organization

Figure 1.5 Clean Wool Export, Million Pounds, 2003/2004



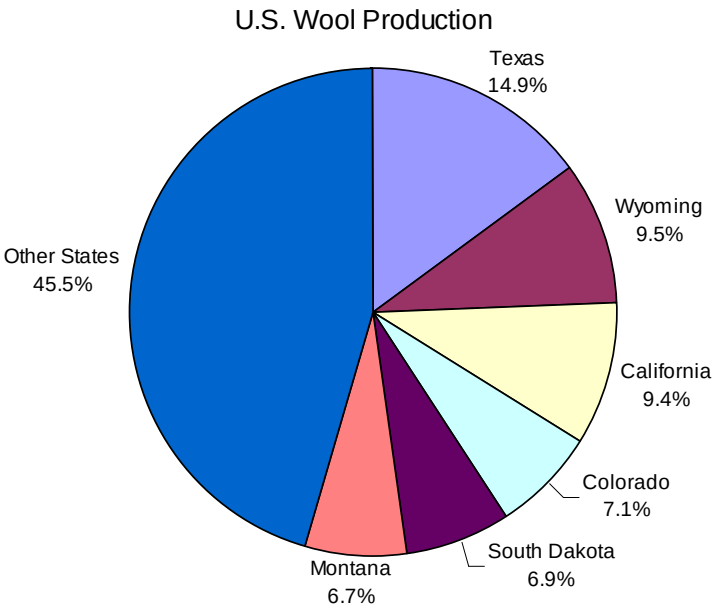
Source: International Wool Textile Organization

1.3.4 The U.S. Wool Market

There were 67,160 sheep operations in the U.S. in 2004 (Livestock, NASS, USDA) and the national sheep herd consisted of 6.23 million head in January 2006, which was 2 percent more than 2005 and 2004 (NASS, USDA). However, it was only 0.5 percent of the world sheep herd in 2003/04. There were about five million heads of sheep shorn, and about 38 million pounds of wool were produced in 2004, which brought 7.5 pounds for the average weight of a single U.S. fleece. About 63 percentage of U.S. wool were shorn during April, May, and June. The U.S. sheep industry is found mostly to the west of Mississippi River. Texas, California, Wyoming, Colorado, and South Dakota are the top five sheep producing states, while Texas, Iowa, Pennsylvania, Ohio, Oregon are the states with the top five numbers of sheep operations in January 2006 (NASS, USDA). Texas, Wyoming, California, Colorado, and South Dakota were

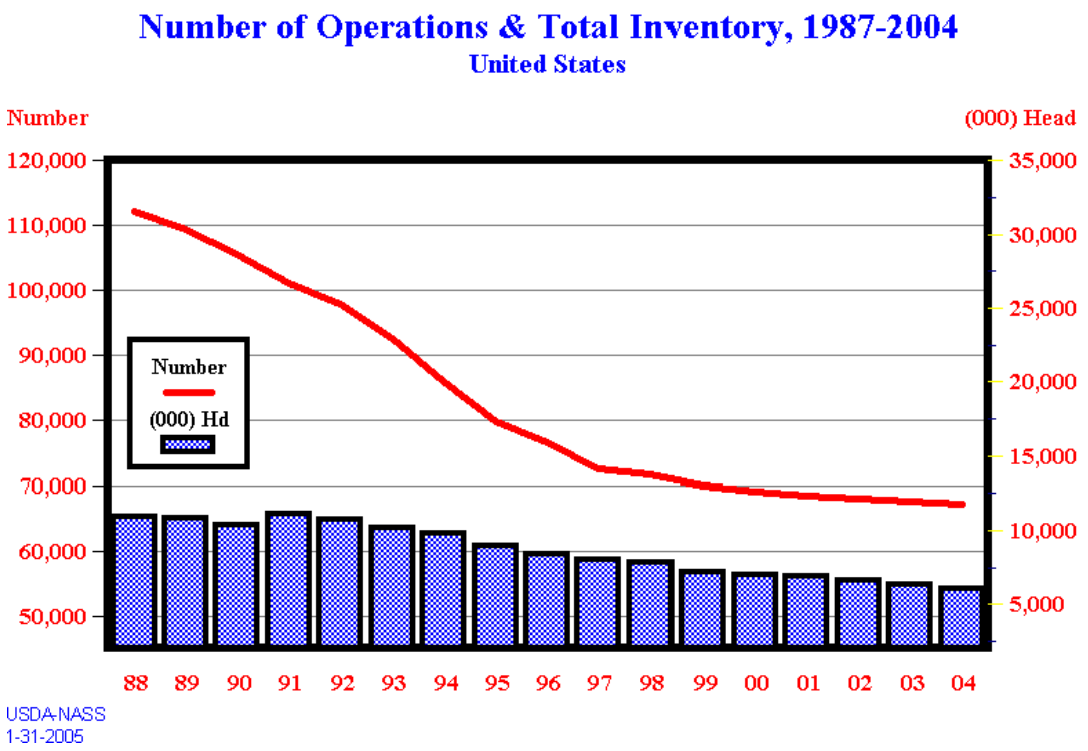
the top five wool producing states in the U.S., accounting for 47.8 percent of U.S. wool production (Figure 1.6).

Figure 1.6 U.S. Wool Production, 2006



Source: National Agricultural Statistics Service

Figure 1.7 Number of Operations and Total Inventory, 1987-2004



There are 47 breeds (or types) of sheep in the U.S. as of The American Sheep Industry Association classifies these breeds into six groups: meat breeds (Cheviot, Dorset, Hampshire, Montadale, North County Cheviot, , Oxford, Shropshire, Southdown, Suffolk, Texel, and Tunis), fine wool breeds (American Cormo, Booroola Merino, Debouillet, Delaine-Merino, Rambouillet), long wool breeds (Border Leicester, Coopworth, Cotswold, Lincoln, Perendale, Romney, Wensleydale), dual purpose breeds (American Miniature Brecknock, Columbia, Corriedale, East Friesian, Finnsheep, Panama, Polypay, Targhee), hair and double-coated breeds (Barbados/American Balckbelly, California Reds, Dorper, Katahdin, Romanov, Royal White Sheep, St. Croix) and minor breeds (Black Welsh Mountain, Blueface Leicester, California Variegated Mutant, Clun Forest, Gulf Coast, Icelandic, Jacob, Karakul, Navajo-Churro, Scottish

Blackface, Sennybridge Welsh Mountain, Shetland, Wiltshire Horn). The average grease fleece weights produced are in the Table 1.1.

Table 1.1 U.S. Sheep's Average Grease Fleece Weights Produced by Breed

	BREEDS	AVERAGE GREASE FLEECE WEIGHT (lb)
Meat Breeds	Cheviot	6.5
	Dorset	6.5
	Hampshire	8
	Montadale	7.5
	North County Cheviot	9
	Oxford	8.5
	Shropshire	8
	Southdown	6
	Suffolk	8.5
	Texel	10
	Tunis	6.5
	AVERAGE	*7.73*
Fine Wool Breeds	American Cormo	6.5
	Booroola Merino	12
	Debouillet	12
	Delaine-Merino	11.5
	Rambouillet	12.5
	AVERAGE	*10.9*
Long Wool Breeds	Border Leicester	10
	Coopworth,	15
	Cotswold	13.5
	Lincoln	14
	Perendale	8
	Romney	14
	Wensleydale	18
	AVERAGE	*13.21*
Dual Purpose Breeds	American Miniature Brecknock	-
	Columbia	4
	Corriedale	12.5
	East Friesian	10.5
	Finnsheep	6
	Panama	14
	Polypay	8.5
	Targhee	14
	AVERAGE	*9.93*

Table 1.1 U.S. Sheep's Average Grease Fleece Weights Produced by Breed (Continued)

	BREEDS	AVERAGE GREASE FLEECE WEIGHT (lb)
Hair and Double-coated Breeds	Barbados/American Balckbelly	-
	California Reds	6
	Dorper	-
	Katahdin	-
	Romanov	9.5
	Royal White Sheep	-
	St. Croix	-
	AVERAGE	*7.75*
Minor Breeds	Black Welsh Mountain	3.5
	Blueface Leicester	7
	Variegated Mutant	9.5
	Clun Forest	7
	Gulf Coast	5
	Icelandic	4.5
	Jacob	4.5
	Karakul	7.5
	Navajo-Churro	6
	Scottish Blackface	5.5
	Sennybridge Welsh Mountain	9
	Shetland	3
	Wiltshire Horn	-
	AVERAGE	*6.00*

Source: American Sheep Industry Association

**Bold breeds are the lead breeds that are used to produce organic wool in the U.S.*

Marketing methods used for U.S. wool differ across regions. Wool pools are widely used by producers all over the nation, where small wool producers bring their wool together to increase marketability through larger lot size (Figure 1.8). There are more than one hundred wool pools in the U.S. In addition to wool pools, wool warehouses are popular in the eastern states, where wool warehouses hire shearers to shear wool and purchase wool from producers directly or transport them to warehouse as consignment. And then this wool will be graded for purchasing by the wool trade. In the western U.S., most of wool is taken in on consignment and marketed by producers. There are more than forty warehouses located in the U.S., especially in

the Texas and New Mexico, where almost all wool is marketed through warehouses. Another way to market wool is directly through wool dealers and brokers, and there are more than thirty dealers/brokers in the country. Mills are mostly located at east coast, which produced from lightweight worsteds to fancy woolens.

Major U.S. wool processors such as Burlington, Pendleton, Forstmann (purchased by Victor in 1999), and Chargeurs use both U.S. wool and wool that are imported from Australia and New Zealand to meet their operational capacities, in addition to using up all the U.S. wool (American Sheep Industry Association). U.S. wool exports had increased from two percent to 56 percent from 1976 to 2004 (Bureau of Census and USDA). Most of the increases happened in 2000s, which is believed to have links to the depression of U.S. mills. It is found that 32 percent of garment sold at retail stores in the U.S were imported in 1982, versus 93 percent now (Savage, 2006). Most of Australian wool has been used in apparel producing, while New Zealand's has been used for industrial and home interior products.

U.S. wool clip is similar to Australian clip in terms of quality, thus, U.S. wool prices fluctuated with Australian wool prices. Since China and Hong Kong purchase 20 percent of the world's wool clip, and Asia is a major destination of Australian wool, the Asian market has played an important role in determining wool prices. As a result, Australian and U.S. wool prices have been largely dependent on the Asian economic conditions (American Sheep Industry Association).

Figure 1.8 Locations for U.S. Warehouses, Pools, and Mills

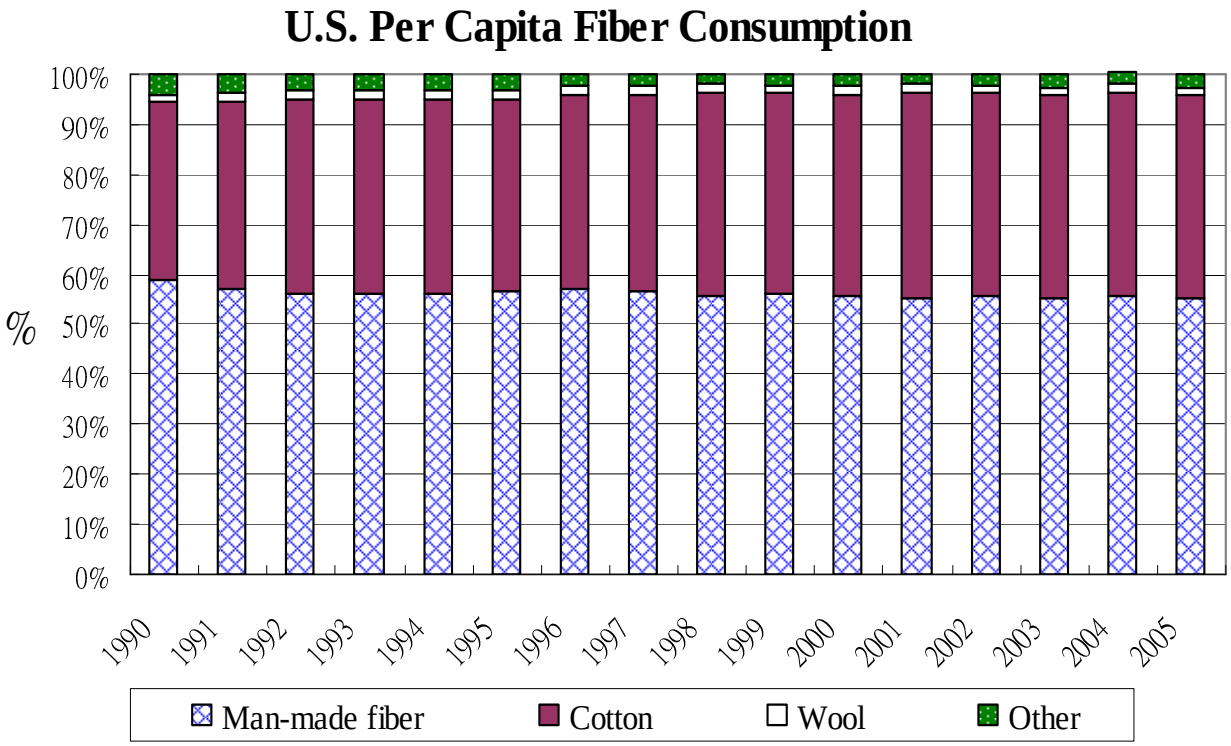
Source: American Sheep Industry Association (http://www.sheepusa.org/?page=site/text&nav_id=55b41c63d9478a5f75ad2c23f68fd3cb access on 2006).

The American Sheep Industry Association (ASI) represents 64,000 sheep producers in the 41 states of the U.S. to promote the well-being and profitability of the U.S. sheep industry. The ASI's American Wool Council had expended nine million dollars by 2000 to increase competitiveness of U.S. wool by improving quality of raw wool, developing new technology, international marketing, and market research. The funds primarily came from taxing certain imported fine wool yarns and fabrics, and this fund had successfully helped U.S. wool doubled its exports from 1999 to 2003. The American Wool Trust Fund added 4.5 million dollars for 2005 and 2006 fiscal years' usage. ASI has been working on the development of new products/uses of wool, such as machine-washable wool, sound absorption material, and military garments. They also developed industry guidelines and formed a shearing task force to improve

raw wool quality. Their tasks also include cooperating and partnering with industry groups and government agencies, enhancing producer communications by informing major industry issues and wool payment programs, providing marketing information by maintaining and expanding databases of sheep inventories, operations, prices, exporting and so on, and research on increasing wool production. Besides these, ASI has worked on developing risk management tools and promotions founding for events such as wool festivals and Make-It-Yourself-With-Wool contests to help U.S. sheep/wool producers to gain more profits.

U.S. per capita fiber consumption had gradually increased from 66.7 pounds to 86.9 pounds during 1990 to 2005. U.S. population had grown 16 percent from 1990 to 2005. During this period, cotton consumption in the U.S. had grown the most by 48.7 percent. Consumption for manufacturing (synthetic) fiber also grow 22.4 percent, while wool consumption only grew 16.7 percent, which was very close to the population growth rate. As mentioned in the introduction section, U.S. clean wool consumption has dropped indicating that increasingly less clean wool has been processed in the U.S., but U.S. consumers consumed more fiber including wool. Figure 1.10 shows the per capita fiber consumption share in 2005. Synthetic fiber had the largest market share (55 percent), followed by cotton (40%), other natural fiber (three percent), and wool (two percent).

Figure 1.9 U.S. Per Capita Fiber Consumption, 1990-2005



Source: Fiber Economics Bureau, Fiber Organon

1.3.5 The Australian Wool Industry

Australia is the world's largest wool producing country, accounting for on average about 31 percent of world production from 1996/97 to 2003/04. During the last ten years, production of wool has been declining in Australia, due to the decline in demand. Australian clean wool production has fallen by 28 percent, from 1.04 million metric tons in 1996/97 to 0.75 million tons in 2003/04. Australia is also the largest wool exporting country, exporting almost all of its production to fifty-two countries. The major markets are China (accounting for around 30 percent of Australia's wool exports), followed by Italy, Taiwan, Republic of Korea and France in 2002 (Australian Bureau of Statistics). In addition, wool exporting valued at 2.5 billion U.S.

dollars in 2004/05, was 8.3 percent of Australia's agricultural exports ranking after beef, wheat, and wine in 2004/05. Australian wool accounted for 51 percent of global wool apparel produced in 2004 (Woolmark Company).

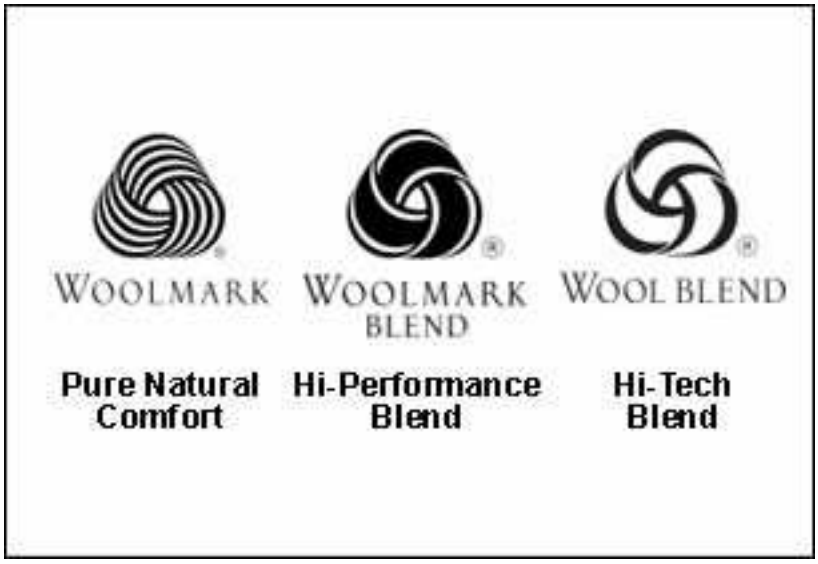
To minimize the damaging effect of short-term economic cycles and decreasing wool demands on the income of wool growers, a wool deficiency payments scheme was introduced in 1970. To provide growers with a guaranteed minimum price for their wool, a minimum reserve price was initiated in 1974. It was partially funded by taxes paid by growers on the value of shorn wool and was administered by the Australian Wool Corporation (AWC). AWC purchased wool that did not meet the minimum reserve price and sold later during periods of higher prices. This scheme could not be maintained after AWC's wool stock reached 4.7 million bales in 1991. Now, Australian Wool Innovation (AWI) takes care of the wool levy, research and development, and TWC Holdings Inc. manages the commercial development of the Woolmark brand and its sub-brands. The Australian Wool Services (AWS), started operation on January 2001, with over 36,000 woolgrowers applying shared, which represented over 70 percent of wool tax received at the time of conversion (Australian Bureau of Statistics).

The Merino breed is the dominant breed in Australian farmed sheep. It is believed that more than 80 percent of all Australian sheep are pure Merino, and most of the remainder is at least mixed with Merino blood. The most commonly seen Merino sheep in Australia are 1) Peppin Merino, 2) Saxon Merino, 3) South Australian Merino, and 4) Spanish Merino. Peppin Merino can produce up to 22 pounds of wool per year, and the stud ram can even produce more than 44 pounds of wool per year. In other words, Peppin Merino can produce double volume of wool, compared to the most productive wool breeds in the U.S. (Table 1.1). Saxon is the smallest breed of Merino with the lowest level of wool per animal (8.8 – 11 pound per year), but

its wool is bright, white, soft, and fine. Superfine Saxon Merino wool is sold with the highest price premium in the market. Wool cut from South Australia Merino is the thickest among all other Merino wool. Spanish Merino is the first Merino breed introduced to Australia and produces about the same weights of fleece as Peppin Merino.

Woolmark, Woolmark Blend and Wool Blend are licensed by AWS, the leading wool fiber textile authority in the world. Woolmark is a globally recognized label, designed by an Italian artist in 1964, indicating 100% pure new wool that has met AWS quality specifications. The Woolmark Blend was created in 1971 to support wool blends' innovation. Woolmark Blend stands for products with a minimum of 50% wool blended. The Wool Blend was launched in 1999 to promote high-tech wool blend products that contain 30 to 49 percent of wool.

Figure 1.10 Labels for WoolMark Products



Source: Australian Wool

Research by AWS shows that 66 percent of the subjects in their study felt confident about buying wool clothing with the Woolmark logo, and 67 percent were aware that garment must

pass special quality requirements to be able to use the Woolmark logo. Besides, 59 percent of the subjects thought Woolmark is associated with better quality clothing brand names. Moreover, 78 percent of the subjects were willing to pay more for a washing machine with a Woolmark-approved cycle. Consumers also showed their confidence on carpet and bedding with woolmarks. Obviously, products with Woolmark logo could increase sales, not necessarily just of Australian wool products but of wool from other countries that meet their standards.

AWS started to work on developing environmental policies in January 1992. They focused on: 1) understanding of wool and its environmental potential; 2) environmental improvement opportunities; 3) research and development work in environmental criteria, and eliminating damages from wool production, processing and marketing; 4) guidelines for environmental practice; 5) encouraging to establish environmental policies and action plans; and 6) funding Environmental Wool Science Developments (Woolmark company, AWS) Nevertheless, a boycott by U.S. companies of Australian wool in 2005 due to animal welfare issues had cost the Australian wool industry a loss of $25 billion in annual revenue (see SaveTheSheep.com for more information).

1.3.6 Consumer Trends in Apparel Shopping

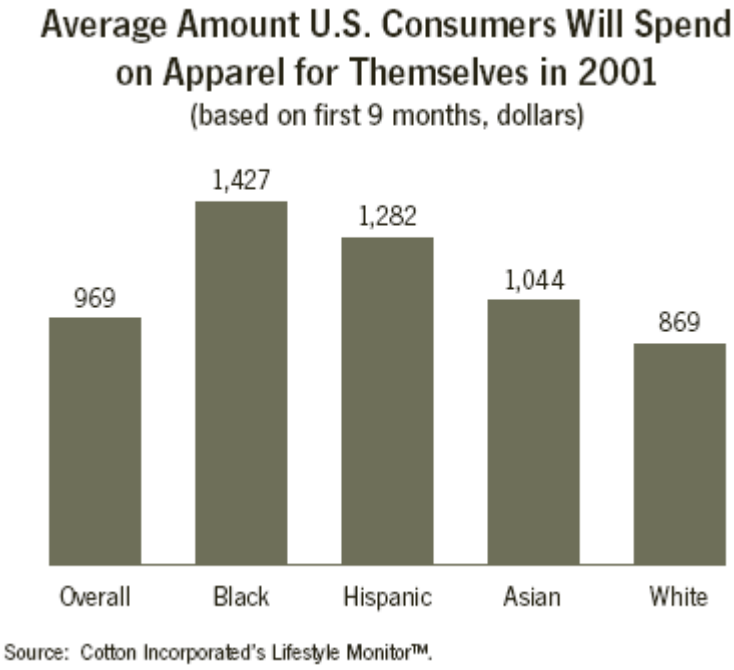
During the recent decades, consumers in the U.S. have spent relatively less amount of money on apparel shopping. For instance, apparel spending was down from 4.9 to 4 percent from 1995 to 2004, representing a loss of 324 billion U.S. dollar (Bureau of Economic Analysis), during when expenditures on cell phones and medical services had increased from 0.2 to 0.7 percent and from 20 to 23 percent, respectively. However, this does not necessarily implying a

decreasing in the number of clothing items purchased. Because of deflating garment prices, consumers are able to buy more for less. U.S. is the biggest apparel market for China, which shared 12 percent in 2003, and followed by Mexico for 10.5 percent.

Cotton Incorporated and Cotton Council International conducted Global Lifestyle Monitor surveys (GLMS) in 1999 and 2001. It covered ten countries (Brazil, Colombia, Germany, Italy, United Kingdom, Hong Kong, Japan, Korea Taiwan, and India) from East Asia, Latin America, and Western Europe, and 500 subjects, ages from 15 to 54 years old, were surveyed in each country. Results from GLMS indicated that 1) small independent clothing retailers were more favored; 2) casual wear was becoming more and more popular; and 3) fiber content was a primary concern for apparel purchasing. Per capita spending on clothing had fallen from $934 per year to $902 per year globally. People from Hong Kong and Korea were found to enjoy apparel shopping the least, but their apparel expenditures were above the average. The results also showed that 84 percent of consumers bought their apparel at independent retailers (25 percent), department stores (21 percent), and chain and specialty stores (19 percent each). Moreover, 80 percent of subjects preferred to buy basic clothing than the latest fashion styles. In the survey, participants were asked to identify factors such as price, color, quality, and fiber that they considered before making purchasing, and 75 percent of consumers viewed fiber content as one of their top concerns. Over 70 percent of consumers were likely to pay more for natural fibers in Taiwan (87 percent), Italy (80 percent), India (78%), and Hong Kong (72%). They also found that 50 percent of global subjects usually or always checked fiber content labels before buying apparel. Some fibers such as polyester/Dacron and nylon were the least favored by consumers. They concluded that manufactures should consider globalization, casual style, and fiber content as important directions in targeting new markets.

According to the U.S. Census, the minority population had grown 34 percent from 1990 to 2000. A lifestyle survey conducted by the Cotton Incorporated for the first three quarters of 2001, which focused on multicultural shoppers' behaviors, showed that black people spent the most amount of money on apparel for themselves, and white was the least (Figure 1.11). Department stores were the most favored by black people; Asian people liked specialty stores the most, and both Hispanic and white people enjoyed clothing shopping at chain stores the most. Their results also showed that 37 percent of minority shoppers were willing to buy at regular prices, compared with 25 percent of white people. They stated that impulse buyers tend to spend more money on apparel than those who planned their apparel shopping. Their results showed that 52 percent of minority consumers made their purchasing on impulse, while 39 percent of white consumer did impulse shopping. Moreover, skirts and dresses were found to be on what Asian, Hispanic, and white consumers spent the most of their apparel expenditure, with 31.5 percent on average, compared with other apparel items such as slacks, jeans, sweat apparel, and shorts.

Figure 1.11 Average Amount U.S. Consumers Were Willing to Spend on Apparel for Themselves, January-September 2001



Product quality on clothing has received more attention, compared with other manufacturing sectors (Figure 1.12). Again, according to GLMS in 2002, 62 percent of the respondents preferred quality when they had to choose between fashionable and high-quality apparel. Besides, 30 percent of subjects believed that higher-priced clothes were better quality than lower-priced ones, which was five percent lower than the survey results from 2001. However, only 56 percent of the respondents were willing to pay more for higher quality, which was eight percent lower than their findings in 1994. Although, price was the most important information to know before buying a garment, price was not the only criterion (Figure 1.13). They gave an example on Turkish towel, where the price of Turkish towel was 79 percent more

than the world average price from 1989 to 2002, but they had become the fifth from the 22nd foreign towel supplier in the U.S. market.

Figure 1.12 Percentage of Consumers' Complaints That Were About Quality by Industry, 2002

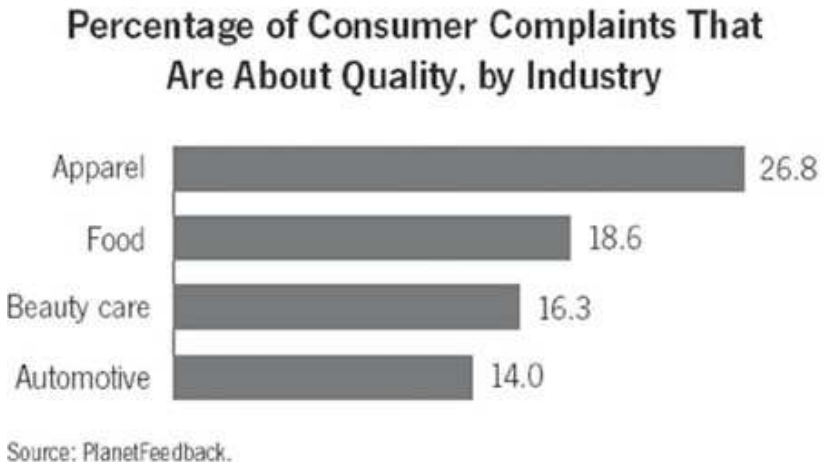


Figure 1.13 Information That Were Important to Know Before Buying Clothing, 1994 and 2002

Information Important To Know Before Buying Clothing (Percent Responding)

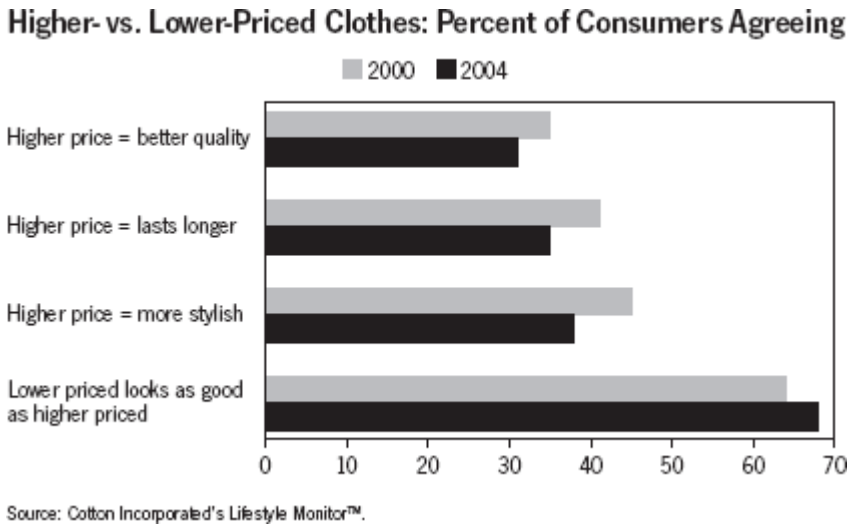
	1994	2002	Change
Price	68	80	12*
Fabric content	47	57	10*
Laundry instructions	34	48	14*
Where it was made	45	41	–4
Brand name	29	35	6*
Environmentally friendly	27	35	8*

*Significant change.
Source: Cotton Incorporated's Lifestyle Monitor™.

In 2004, a follow-up study about consumers' understanding of garment quality was conducted by the Cotton Incorporated to identify factors that affect quality of clothing perceived by consumers both before and after purchases. The respondents identified price, garment construction, comfort, and brand as important pieces of information that they would consider before purchases. The respondents were concerned with wearability, laundering performance, and durability after purchasing. They wanted to know if the extra amount they paid represented better wearability, laundering performance, and durability, and such information would be referred to when they shop for apparel next time. The following figure showed how the respondents considered the relationship between price and quality, durability, and stylish in 2000 and 2004. Fewer consumers thought higher prices represented better quality with more durability and style. Particularly, more than 60 percent of consumers agreed that lower-priced garment could look as good as higher-priced clothing, and the percentage grew over those five years. They also found that consumers were more willing to trade quality for lower-priced apparel, which might only worn a few times such as fast fashion items.

The proportions of apparel purchased at stores that were machine washable were 82 percent and 86 percent in 1990 and 1999, respectively (Cotton Incorporated). It also can be explained by the consumers' preference shifting to more casual lifestyle. Casual days at work had grown from 57 percent to 68 percent from 1994 to 1999 (Cotton Incorporated). Moreover, sales for casual clothing such as knit tops, work shirts, sweaters and jeans had grown twice as fast as sales for tailored garment such as suit, dress pants and shirts. In 1999, 29 percent of tailored apparel was labeled for home care, compared to 71 percent of casual clothing. The same survey also found that people in the age group of 45 to 54 checked apparel care label the most frequently and had the highest percentage of respondents avoiding purchases because of care labels.

Figure 1.14 Higher- vs. Lower-Priced Clothes: Percent of Consumer Agreeing in 2000 and 2004



In the U.S., children who were under fourteen years old represented 21 percent of all population in 1998, and children's garment sale had reached $28 billion in 2003. Only 5.6 percent of childrens' clothing were manufactured in the U.S. in 2003, when 15 percent of children's garment was imported from Mexico, followed by China for 6.8 percent. Based on a retail audit that was conducted by Cotton Incorporated in three cities (Raleigh, St. Louis, and Denver) for over 8,800 garments in 2003, 70 percent of the contacted mothers stated that their purchases were specifically requested by their children. Moreover, half of children attire was bought from mass merchants, and 37 percent were from national chain stores.

Another finding from Cotton Incorporated in 1999 showed that 76 percent of consumers do not like to wear wrinkled apparel. Therefore, developing wrinkle-resistant wool products could be another key to expand wool consumption in the U.S. Machine washable was also an important factor to appeal consumers purchasing.

A research survey conducted by AlixPartners in July 2006 found that U.S. luxury apparel shoppers were more interested in quality than designer names. While cotton has been the main textile consumption in the U.S. market, this survey showed positive attitudes among wealthy respondents towards wool products. Their results suggested that consumers valued product quality the most, followed by experience, access, and price when shopping for apparel. However, casual clothing accounted for 70 percent of apparel market, and young adults who dominate apparel expenditure valued price and performance more than textile when shopping for apparel (Woolmark Company).

These studies seem to suggest several ways the U.S. wool industry could focus their marketing efforts. The population segments with growing apparel expenditures included children, minorities (Black, Hispanic, and Asian), natural fiber lovers, and people favor in casual life style. Thus, designing the wool products that appeal to children could be a possible way to open a niche market for U.S. wool. Wrinkle-resistance was found to be one of wool's advantages over other fibers. Therefore, research and development on combining wool with other fibers to create more wrinkle-resist garments could be a method to increase wool demand. Moreover, the U.S. luxury shopper segment will be a good target market for quality wool products.

CHAPTER 2 - Literature Review

During the nineteenth and early twentieth centuries, the wool industry played an important role in economic development, especially for Australia, South Africa, and New Zealand. Then, the rayon industry began to improve production methods and economies of scale in the 1920s, and began to compete with the wool industry in the 1930s. Also, during that time, the synthetic fiber industry began to grow in France, Germany, Italy, Japan, and U.S., indicating that the downturn in the wool industry would not just be in the short run (Abbott, 1998).

Studies about consumer WTP found that some product attributes may add market values. For example, consumers valued attributes such as organic (Nimon and Beghin, 1999; Loureiro and Hine, 2001; Dransfield et al., 2005; Harper and Makatouni; 2002), environment-friendly (Aguilar and Vlosky, 2007), animal-friendly (Harper and Makatouni, 2002; Chakraborty, 2005; Howard and Allen, 2006), and locally grown (Loureiro and Hine, 2001; Govindasamy, Italia, and Thatch, 1999; Sirieix and Schaer, 1999; Giraud and Bond, 2001; Peterson and Yoshida, 2004; Tonsor et al., 2005) positively, augmenting the product values. However, Nimon and Beghin (1999) found no price premium for environment-friendly dyes, and McEachern and Schroder (2002) found that consumers were not interested in organic meat and ethical subjects. Forney, Rabolt, and Friend (1993) discovered that COO attributes would not affect consumers' apparel shopping behavior, and research done by Harper and Makatouni (2002) indicated that consumers easily confused with organic and free-rage attributes.

Because of the lack of consumer studies on wool products, the reviews of consumer profiles and preferences need to focus on other goods. This chapter will first review articles about

measuring consumers' WTP, followed by a review of studies that specifically estimated consumers' WTP for organic, environment-friendly, animal welfare, locally grown, and COO attributes are discussed. Articles that discussed consumer segments that pay attention to labeling for socially responsible production are then reviewed. These discussions provide an overall picture of consumers' preferences towards products with various attributes.

2.1. Hypothetical Bias and Its Mitigation

To measure the willingness-to-pay by using choice experiment, individuals are asked to choose an alternative, where the product's attributes, including price, from a choice set that consist of products with hypothetical attributes. Since participants are asked to answer in a hypothetical situation, instead of actually spending money, the difference between hypothetical and real values can be considerable. Efforts in minimizing this difference have been seen in several studies. Blackburn, Harrison, and Rutstrom (1994) and Fox et al. (1999) estimated calibration functions relating the answers that participants gave for hypothetical and real valuation questions. They found that semiparametric model, where the conditional probability was analyzed, could correct hypothetical responses better. However, they also found that their application was limited in private good and using in a small sample, and maybe commodity specific. Loomis et al. (1994) and Neil et al. (1994) both reminded their respondents with budgetary constraints in order to reduce biases. However, their results showed no significant difference between discussing the budget with participants and not doing so.

Cummings and Taylor (1999) introduced a cheap talk script in their study, which estimated consumer values for environmental goods using a contingent valuation method. Cheap talk

scripts explain to the subjects what a hypothetical bias is and why it may occur before the subjects answer the questions. The subjects for Cummings and Taylor's experiments were undergraduate students. They held a total of sixteen experiments. The authors found that cheap talk scripts can eliminate hypothetical bias efficiently, and this finding was robust across different cheap talk scripts and different experimental designs. Cheap talk scripts were not efficient in lowering willingness-to-pay values for commodities that had no hypothetical biases to begin with. They concluded that cheap talk may be applicable to a variety of field researches.

Paradiso and Antonella (2001) tested the effect of knowledge on the disparity between hypothetical and real willingness to pay. They designed four treatments to compare WTP estimations: 1) hypothetical WTP for the good indirectly known to subjects, 2) hypothetical WTP for the good directly known to subjects, 3) real WTP for the good indirectly known to subjects, and 4) real WTP for the good directly known to subjects. The good that was used in the valuation was an antique print. The indirect knowledge referred to the characteristics of the print that were explained, such as the date, size, and subject of the print. The direct knowledge about the print was obtained from physical inspection. The experiment with incentive was completed by one hundred randomly selected postgraduate students aged 22 to 27. Their two major findings were that direct knowledge reduced differences between hypothetical and real WTP, and that the difference in knowledge settings produced different perceptions of commodities' attributes.

Auger et al. (2003) investigated how much consumers would pay for social product features. In their study, they used ethical disposition survey and choice experiment, where the choice experiment included eight experimental conditions and two control conditions. Unlike the experimental conditions, the control conditions did not have any ethical attributes in the

choice experimental profiles. With respect to the control conditions, the participants either were given information about ethical factors or no information at all. Their surveys were completed by the MBA students at an Australian university, undergraduate students at Hong Kong University, and supporters of the human rights organization Amnesty International in Australia. Results suggested that consumers had limited knowledge about commodities' ethical dimensions. Moreover, their results also showed that the provided ethical information could change the subjects' shopping patterns. In addition, bath soaps and athletic shoes were used to measure the values of ethical product features. Their results showed consumers were willing to pay more for ethical attributes for bath soaps, such as biodegradability ($0 to $0.16), no animal testing ($0.06 to $0.87), absence of animal byproducts ($0 to $0.63). For athletic shoes, their subjects were willing to pay more for ethical features: acceptable living conditions ($0.47 to $29.74), moderately minimum wages ($0.32 to $35.09), non-child labor ($0.28 to $84.73), and dangerous working conditions ($0.03 to $121.44).

In addition, Lusk (2003) researched the effects of cheap talk on consumer willingness-to-pay for golden rice with 4,900 mail surveys with a 14 percent response rate. Golden rice was a new variety of rice, which is genetically enhanced with vitamin A, whose future success in the market was uncertain. He noted that many willingness-to-pay estimation studies showed that people seem to easily amplify their willingness-to-pay for quality-improved or function-added goods. Half of mail surveys contained a cheap talk script and brief introductory information on golden rice. The information was provided in two forms: an advertisement provided by Council for Biotechnology Information (CBI) and a statement written by the author. The author asked a double-bounded dichotomous choice question to distinguish those respondents willing to pay a premium for golden rice and analyzed the responses using an interval-censored model. He found

that cheap talk decreased their willingness-to-pay for most consumers but not for those already knowledgeable about golden rice and genetic engineering. His results were consistent with both Cummings and Taylor (1999) and Paradiso and Antonella (2001).

Harrison (2006) also discussed the role of cheap talk in a research about experimental evidence on alternative environmental valuation methods. The author focused on a research done by Cummings et al. (1997), where the "Light Cheap Talk" and the "Heavy Cheap Talk" were introduced. In their research, results indicated that the "Light Cheap Talk" increased hypothetical bias, while the "Heavy Cheap Talk" decreased hypothetical bias. However, the author doubted that the "Heavy Cheap Talk" was not cheap talk at all, due to the confounding with a change in the alternatives that were being valued. The author also listed List (2001), Aadland and Caplan (2003), and Brown et al. (2003) as examples where cheap talk did not work for all subjects.

Napolitano (2008) studied the effect of information about animal welfare on consumer WTP for yogurt. There were 104 consumers participating in their experiment, and those consumers were asked to rate their WTPs: 1) blind WTP, where consumers tasted yogurt without being provided with animal welfare information; 2) expected WTP, where consumers were provided with animal welfare information, but not allowed to taste the products; and 3) actual WTP, where consumers could taste the yogurt, and animal welfare information was given. The second price Vickrey auction was applied by the authors to assess WTP for yogurts according to different levels of animal welfare utilized during the production process. Results indicated that animal welfare information could be a determinant for the individuals to increase their WTP for animal-based food products. In addition, the differences between expected WTP and actual WTP might

be due to the sensory properties of the products. Therefore, it is important to pair animal welfare information with a good quality product to increase WTP.

2.2 Consumer Perceptions of Origin-Specific Products

Country of origin (COO), also known as product country image, has been researched for years. By Roth and Romeo's (1992) definition, country image is the overall perception that consumers form of products from a particular country, based on their prior perceptions of country's production and marketing strengths and weaknesses. Papadopulos (1993) argued that COO could influence consumers' purchasing decisions. Pecher and Tregear (2000) found that consumers' evaluation of products' quality varied by the product's country of origin. Previous research found that country image perceptions were related to price and quality level (Han, 1989), consumer demographics (Baughn and Yaprak, 1993), and product familiarity (Johansson, 1989).

Neuhauser and Morganosky (1994) tested the effects of schematic information processing of COO cues in catalogs. The authors first noted the importance of the impact of how information is presented on catalog purchasing. They randomly selected 400 telephone numbers from a medium size Midwestern city limiting the participants to be at least 18 years old, and they received a 75 percent response rate. Consumers were asked to rank quality and price image of clothing from each different country of origins (China, Costa Rica, Korea, Italy, and United States). They found that consumers predicted higher quality for clothes made in U.S., Korea, China, and Costa Rica than the actual quality, and no differences between actual and predicted

quality for Italian clothing. However, the price images were not significantly different from actual and predicted values among these countries of origin.

In a study by Becker, Benner, and Glitsch (2000), consumer perception of quality of fresh meat (beef, pork, and chicken) in Germany was investigated. Their survey contained questions about quality of meat in the shops (for example, COO, color, place of purchases, brand, marbling, and price), eating quality, safety concerns, other quality concerns, use of symbols and labels, and trust in information. Their telephone survey was conducted by an Irish market research centre, where they randomly selected people who were mainly responsible for shopping for their household. Their results indicated that COO and place of purchase were the top two consumers' concerns when buying beef. Moreover, the place of purchase was the most important determination for consuming pork. For chicken, however, there was no statistically significant dissimilarity between attributes apart from the price. They concluded that consumers viewed COO as a signal of meat products' qualities and preferred locally produced meat.

A report on the case of New Zealand lamb where COO was being used as a brand was completed by Clemens and Babcock (2004). New Zealand lamb has used COO labeling as a "country brand" in the world meat market, where consumers view this brand of lamb as high quality. Lamb itself is a niche product relative to beef, pork and poultry, and commands relatively high prices in restaurants. New Zealand lamb has emphasized the following characteisticrs to attract consumers: 1) free range; 2) good animal welfare practices; 3) no use of growth-promoting hormones, steroids, or other chemicals; 4) good processing quality; 5) leanness; and 6) standard and custom-made cuts (Clemens and Babcock, 2004). Although opponents have argued that adoption of COO labeling regulation will increase domestic products' costs and benefit importing goods, a positive image of a product associated with the

COO could increase its demand. Therefore, a good product image of U.S. lamb or wool has a possibility of bringing price premiums to sheep farmers in the U.S.

2.3 Consumers' Preferences towards Locally Grown and Origin-Specific Products

In order to help U.S. wool industry, it is important to investigate if U.S. consumers would prefer and willing to pay more for domestic products over foreign products. Forney, Rabolt, and Friend (1993) surveyed 209 university women in California and New Zealand to examine the different consumer reactions to COO and prices of clothing items. Their surveys showed that both U.S. and New Zealand females were aware of COO, but it did not affect their decisions when purchasing clothing.

Askegarrd and Madsen (1995) argued that specific regional consumption patterns remained, even as the trade globalization tendencies and international convergence continued to grow (cited in Sirieix and Schaer, 1999). However, Duflos et al. (1998) found only a few consumers paid attention to the geographical origin of food products in France, with 6.7 percent of subjects claiming that the origin of a product was the most important determination of product quality. The attempt on enlarging local products' market has been noted as one kind of niche marketing. Local products can benefit producers by lowering transportation costs and satisfying consumers' preference by providing more fresh food (Govindasamy, Italia, and Thatch, 1999). Moreover, Patterson et al. (1997) found that consumers who are more frequently consuming fruit and vegetable, aware of the 5 A Day campaign, permanent residents of Arizona, and with higher level of education had higher degrees of awareness of locally grown, which can increase

consumers' willingness for buying local grown product. They also indicated that shoppers who were older, frequently consuming fruit and vegetable, and residents of city metropolitan area would prefer locally grown products better.

Govindasamy, Italia, and Thatch (1999) surveyed 500 New Jersey residents (with 44% response rate) to find consumer attitudes and response toward state-sponsored agricultural promotion. Their results showed that 79.9% of consumers in New Jersey cared about where fruits and vegetables they purchased were grown, and 89% of them would like retailers to provide information about the originating regions. Furthermore, more than 89% of consumers indicated that they would specifically prefer to buy those fresh foods grown by New Jersey farms. In addition, a high proportion of consumers favored increasing their purchases, if the state-grown logos were given. Most importantly, nearly 75% of subjects were willing to pay more for New Jersey fresh products, 46.8% of whom were willing to pay one to five percent more than the market price. They concluded that it is possible to have high consumer awareness and acceptance when the proper marketing programs are carried out.

Giraud and Bond (2001) investigated consumer preferences for locally made specialty food products in Maine, New Hampshire, and Vermont, where they defined the specialty food as a value-added or premium-priced commodity that can be discriminated from other products by its characteristics such as components' quality, sensory appeal, origin, branding, packing, and product formulation. Their mail surveys designed for "New Hampshire Made" program was administered in New Hampshire in the summer of 2002 with a 59 percent response rate, where a dollar was paid as a reward for filling out the survey. Subsequently, 500 surveys each were mailed in Maine and Vermont in the winter of 2003 with response rates of 60 percent and 58 percent, respectively. In this study, they categorized food products into low-end ($5) and high-

end ($20) groups, and treated state of origin as the main distinguishable attribute from other food products. Using a dichotomous choice contingent valuation method, they found that consumers in these three states were willing to pay more for local specialty products, and the premium increased with the base price of the certain good. However, they did not find any differences in the median price premia across states. Research suggested that different promotional programs will lead to different levels of willingness to pay.

Peterson and Yoshida (2004) studied quality perceptions and willingness-to- pay for imported rice in Japan. In their survey, participants had to choose a package of rice with different attributes (varieties and production regions). A total of 600 surveys were randomly mailed to three Japanese rice production regions in 2002. The response rate was 62.6 percent and 48.4 percent of responses from the original mailing were useable. They used discrete choice modeling based on random utility theory and used a nested logit model after rejecting the null of independence of irrelevant alternatives. U.S. rice competes with Australian, Chinese, and Thailand rice in the Japanese rice market, and was priced 3 to 30 percent less expensive than Japanese rice, but was more expensive than other imported rice at the time of their study. However, prices were not the only factor that Japanese consumer considered when making purchase decisions. They found that Japanese consumers were willing to pay more for Japanese domestic rice (from three distinct regions). Nevertheless, retail prices of imported rice (from U.S., Australia, and China) were higher than consumers' willingness-to-pay in Japan due to unfamiliarity and negative perceptions of safety and flavor. Therefore, the authors suggested promotional actions should be taken to increase positive images for imported rice.

Tonsor et al. (2005) examined consumers' preferences for beef steaks in London, Frankfurt, and Paris. The authors used choice experiments with sixteen scenarios, with each scenario

including five different beef steak alternatives: 1) USDA Choice, 2) USDA Choice No Hormones, 3) USDA Choice No Hormones or GMs, 4) Domestic Typical, and 5) Domestic Source Verified, which disclosed the production practices used and the names of farmers and feeders. The participants were randomly chosen at supermarkets in the above locations in August 2002, and total of 248 participants were paid approximately $16 for London subjects and $20 for Frankfurt and Paris to complete 20 minutes experiments. They applied a random parameters logit model to obtain consumers' willingness to pay for different steaks. Their results suggested that consumers in France and German were willing to pay more for USDA GM-free beef and domestic, farm-specific beef than consumers in the United Kingdom, while German and British consumers were willing to pay more for USDA hormone-free beef than the French. Besides, consumers preferred domestic source verified beef more than domestic typical beef in all these three locations.

2.4 Consumers' Preferences towards Environmentally Concerned Products

Environmental certification has become more and more important in recent years. Consumers are often confused with organic and green products. The following body of research studied environmental label alone to examine if consumers were willing to pay more for environment-friendly products, instead of organic product. Furthermore, Kim and Damhorst's (1998) research tried to recognize how environmental concern related to general and apparel shopping behavior. Their results suggested this dissertation to further investigate whether or not a consumer segment for environment-friendly attribute can be distinguished. Therefore, the possible marketing strategies for U.S. wool products could be developed

Kim and Damhorst (1998) studied environmental concern and apparel consumption. Their research tried to find the relationships between environmentally responsible apparel consumption behavior, environmental concern and general environmentally responsible behavior, and consumers' knowledge of environmental impact of garment products. Their results implied that the participants' awareness of environmental impacts predicted general environmental concern. In addition, they found that environmental concern related to general environmental behavior, and the general environmental behavior were found to be strongly related to environmentally responsible apparel consumption. However, since the survey sample was collected from undergraduate students in a Midwestern university, their conclusions may not be sufficient to explain the general U.S. population's consumption behavior regarding environmental concerns.

Anderson and Hansen (2004) researched the impact of environmental certification on preferences for wood furniture. The objective was achieved by surveying 265 Oregon State University undergraduate students during the 2001/2002 academic year. Five wood CD rack attributes (price, type of wood, adjustability of shelves, and storage capacity) were included in eight profiles of CD rack alternatives in the survey. And the participants were asked to rank in order of preference. Conclusions from conjoint analysis revealed that the students thought environmental certification was a favorable attribute, but its impression did not overweigh that of other attributes. Therefore, the students were not willing to pay more for the environmental certified wood CD racks.

In addition, Wachenheim and VanWechel (2004) investigated the influence of environmental-impact information on consumer WTP for products labeled as free of genetically modified (GM) ingredients. In their research, a random nth-price experimental auction was applied to estimate consumer WTP for non-GM food products, and the participants were 112

students from North Dakota State University. Two types of information about GM foods were provided to different subjects: 1) using less pesticides and conservation of natural resource (positive information) and 2) increased usage of certain herbicides and tolerance in certain species, spread of genes, and dangerous to non-target species (negative information). Their results indicated that the subjects would pay more for non-GM foods. Moreover, they found that when positive information about GM foods was provided, consumers increased their bids for products with standard-label over non-GM label. On the other hand, negative information about biotechnological and environmental impacts could increase the WTP for non-GM products. Therefore, information provided with products could affect the WTP. Similar to Kim and Damhorst's (1998) study, this research may not be sufficient to apply to the general population.

Aguilar and Vlosky (2007) examined consumer WTP price premiums for environmentally certified wood products in the U.S. They collected the data in 1995 and 2005 to identify the changes in WTP, and used an ordered probit model. Their results showed that consumers who believed certification could reduce environmental impacts were more likely to pay more for environmentally certified wood products. In addition, a ten percent price premiums for products with environmentally certified label was found in this research.

2.5 Consumers' Preferences towards Animal Welfare Concerned Products

Similar to environment-friendly attribute, animal-friendly attribute is another characteristic that can be easily confused with organic attribute. Since Australian wool has bad reputation on animal welfare concerns, it is important to know if U.S. consumers are willing to pay more for

the animal-friendly attribute and consumers with what characteristics will be more likely to prefer the animal-friendly attribute.

McEachern and Schroder (2002) examined the role of livestock production ethics in consumers' values towards meat. They interviewed thirty females from both rural and urban areas of Scotland, United Kingdom in the spring of 2000. Results indicated that price and appearance were the major meat purchasing guides. Therefore, their participants were not very interested in consuming organic meat and only a little concerned about ethical subjects. However, their study indicated that the consumers form urban areas were more concerned about animal welfare than those from rural areas. This finding implied that consumers' belief towards animal welfare could be influenced by their familiarity with or dependence on animals.

Chakraborty (2005) studied consumers' attitude towards milk produced without artificially enhanced growth hormone called Bovine Somatotropin (BST). A genetic modified BST can be given to cows to increase milk production, but mastitis and lameness are more commonly found in BST-treated cows. The author drew a sample of systematically stratified, 5,000 households from the Kansas population, and had a 14 percent response rate. A binary choice probit model was used to analyze the data. His results indicated that consumers in Kansas were willing to pay an extra price premium for BST-free milk, and preferred mandatory labeling on BST-treated milk products. However, they also found that as education level increased the less motivation for paying more for BST-free milk.

To keep exploring consumers' preferences for attributes such as animal-friendly, environment-friendly, organic, and locally grown, the following studies were reviewed to provide more information about consumers' preferences.

2.6 Studies Examining Preferences towards Combinations of Attributes

2.6.1 Animal Welfare Concerned and Origin-Specific Products

Howard and Allen (2006) investigated consumers' interest in new labeling schemes in the Central Coast of California. Giving that the U.S. Department of Agriculture did not place a lot of attention on ethical requirements in its organic regulations, Howard and Allen wanted to study the effect of ethical issues on consumers' preferences. They examined consumers' preferences for attributes such as locally grown, living wage, and small-scale. The surveys were sent to 1,000 households in five counties in the Central Coast of California in April 2004, and the response rate achieved was 48.3 percent. A Logistic regression was used to analysis consumers' interests in these labels. Results showed that consumers preferred the Humane label the most, followed by the Locally Grown, and then the Living Wage. Subjects who were female, European-Americans, younger, and/or organic consumers were more likely to favor the Humane label. In addition, their results implied that respondents who had children at home and/or were older preferred the Locally Grown attribute, while the Latino subjects preferred the living wage attribute.

2.6.2 Organic and Origin-Specific Products

Loureiro and Hine (2001) compared the consumer willingness to pay for locally grown, organic, and GMO (genetically modified organism)-free products. Their survey was conducted

in a payment card format to evaluate consumers' willingness to pay, where consumers were provided with six bid intervals from zero to more than twenty cents per pound. Surveys were collected in supermarkets in Colorado during the fall of 2000, and 437 usable responses were obtained. There are four sections in their survey: 1) general consumption patterns and potato attributes, which consumers found important and were willing to pay more; 2) nutritional issues and what would prompt consumers to buy more; 3) biotechnology questions, and 4) demographic information. The responses were analyzed by a multiple bounded probit model. Their results indicated that Colorado consumers were willing to pay more for Colorado-grown potatoes when compared to organic and GMO-free potatoes, where 28 percent of subjects did not want to pay a price premium for Colorado-grown potatoes versus 53 percent of participants not willing to pay more for GMO-free potatoes. Besides, although 42 percent of consumers were not willing to pay more for organic food, 21 percent of consumers would like to pay six to ten cents more for organic food products. The authors also implied that this finding maybe different for other products and other geographical area.

Dransfield et al. (2005) studied consumer choice for pork and found that the price for pork is influenced by its appearance, taste, COO, and information concerning organic pig production in France, Denmark, Sweden, and the United Kingdom. The pork appearance and choice tests were completed in France, Denmark, Sweden, and the United Kingdom with about 200 people in each country and for each test designs (four characteristics and two characteristics) in years 2003 and 2004. In addition, tasting trials were performed in France and Britain. The participants were asked to indicate their willingness to pay after examining the appearance or tasting. The results from an ANOVA analysis showed that consumers would only want to pay 5 percent more for "home country" and "raised outside" labeled pork products, and about one-fifth of consumers

would pay twenty percent more. Their finding was only about half the magnitude of Gil, Gracia, and Sanchez's (2000) estimates in Spain, where an approximate 12 percent price premium was found for organic red meats, chicken, vegetables, and cereals.

2.6.3 Organic and Environmental Concerned Products

Nimon and Beghin (1999) investigated if Eco-labels were valuable in the apparel market. They focused on estimating price premium in U.S. for apparel manufactured from organic cotton, dyed with environmentally friendly dyes, and used no dyes. They expected people to be willing to pay a price premium from clothing with some additional health benefit. Hedonic price functions were estimated using 750 observations of price and characteristic data collected from six retail order catalogs from May to October 1996. Since their price data were not real transactional prices (prices were collected from catalogues), they checked for possible sale and discounts to confirm the price stability, although a previous study by Osborne and Smith (1997) had found that posted and realized prices were similar. Their results showed that organic apparel received a 33.8% price premium. The prices of no-dyes products were discounted approximately by the reduction in production cost. However, they did not find any price premium for products using environmentally friendly dyes, and neither an additional price premium for baby-organic apparel.

In addition, Armah (2002) studied eco-label standards in the fresh organic vegetable market of northeast Arkansas. The consumer-intercept interviews at farmers market and organic retail stores were used to collect data. The respondents (producers, retailers, and consumers) answered "Yes" or "No" questions to indicate if they relied on labels to sell or buy organic produce. And

then, the author used maximum-likelihood logit model to determine the variables that had influences on the eco-label usage in organic products. The author concluded that female consumers had higher probability of consuming eco-label, as well as older consumers and consumers with higher levels of income. However, no direct relationship was found between education levels and marginal probability of the eco-label use.

2.6.4 Organic and Animal Welfare Concerned Products

Harper and Makatounin (2002) studied at consumers' perception of organic food production and farm animal welfare. Four focus groups were conducted in Reading, United Kingdom during the summer and autumn of 1999. The screening questions were used to determine the groups which consisted of parents of four to eleven years old children and responsible for the household food purchases. Results showed that consumers were confused about the differences between organic and free-range products. Also, results indicated that the purchasing decision was influenced by consumers' perceptions, belief, attitudes, and the ability of paying price premiums for organic foods. Furthermore, food safety and health concern were the main factors in motivating participants to choose organic products. However, ethical concerns especially those relative to animal rights were found to play an important role in organic foods consuming since the animal welfare regulations were considered as indicators of food safety.

2.6.5 Others

Sirieix and Schaer (1999) researched German and French consumers' attitudes and behaviors towards organic and local foods. They used computer-assisted telephone interviews to contact 616 persons in Germany and 203 persons in France, and measured the image of organic agriculture in terms of five concepts: animal welfare, health, environment, food taste, and trustworthiness. They found that the percentage of French who regarded organic was better than conventional was higher than in Germany in all these five factors, and the mean percentages for these five criteria were 51.3%, 57.7%, 69.3%, 45.1%, and 41.8%, respectively. However, German consumers preferred local food more than French. On average, 80% of consumers had more confidence in food from their own region and thought local organic food was important. Moreover, 62% of consumers from these two countries would only buy food products from their local region, if possible.

Makatouni (2002) investigated what motivates United Kingdom consumers to buy organic food. The means-end chain theory and laddering method were used to interview 40 subjects in 2000, where the means-end chain theory says that consumers buy products since those products illustrate their desired values. The author narrowed their participants to parents who raised children between four and twelve years old and bought organic food regularly. This research distinguished animal welfare issues between life values related to both animal and human. The concept of "you are what you eat" and "happy animals produce healthy products" were used. His result showed that this group of consumers purchased organic foods because of the health factor for themselves or their family, environment, and animal welfare. However, this research

did not examine the willingness-to-pay for organic products that also represents animal friendly and environment friendly.

Hustvedt (2006) researched consumers' preferences for blended organic cotton garment. The data were collected through a mail survey with 14.9% usable response rate. The author used factor analysis to determine the necessity of including three items in the survey to measure Personal Norm and five items to measure Self-Identity. And then, conjoint analysis and predictive data analysis were applied. The conjoint analysis examined the likelihood of shopping for a certain apparel profile and consumer clusters. The author used predictive data analysis to forecast purchasing intentions for organic cotton garment during the next apparel shopping.

Results from this research indicated that subjects were neutral about their responsibilities of buying organic cotton apparel products and somewhat thought of themselves as socially responsible, organic or environmental consumers. The survey results also revealed that the organic cotton apparel consumers were not demographically different from other healthy/natural food consumers (i.e., less likely to have children under age of eighteen in the home, higher educated, and wealthier than general population). In addition, organic cotton consumers considered environmental impacts from apparel production, and thought that organic farming could protect environment. Results also showed that respondents preferred apparel that was made of moderate percentage of organic cotton fiber than organic apparel, which met the organic processing standards. The author concluded that the participants thought the label for the percentage of organic cotton content was more useful than the labels for fair trade or for donations to cancer research during apparel shopping. Therefore, labeling organic cotton blends could increase organic cotton consumption from consumers who self identified as environmental, socially responsible, and organic consumers.

2.7 Profiles of Socially Responsible Consumers

Researches had debated whether or not consumer segments exist for various products' attributes, which relate to social responsibilities and consumers' ethical concerns. Due to the increasing media coverage (e.g. depletion of the earth's resources and exploitation of child labor), concern about environmental and social problems has dramatically increase among the American population. Consumers who take these attributes into considerations when making their purchasing decision is important to marketers. In addition, it is also essential to investigate consumers with which kind of demographic and psychographic characteristics are more environmental and socially conscious.

Roberts (1996) pointed out that even though consumers claimed that they would pay more for environmentally compatible products, the U.S. consumers did not actually buy these products. In his study, Roberts summarized findings from previous researches that the attitude-behavior gap resulted from: 1) the price premiums for green commodities being too high, 2) price, quality, and convenience affected consumers' purchasing decision more than the product's environmental attribute, and 3) the consumers being unclear about green commodities. To examine the attitude-behavior gap, the survey method was used, with a 46 percent of response rate consisted of a randomly selected sample of 1,503 U.S. adults. Roberts indicated that 18 percent of the subjects were willing to buy for socially responsible products or services always to most of the time, while 39 percent of the subjects said that they never, rarely, or sometimes consumed these socially concerned products. Also, respondents' gender, income, and age were slightly related to their socially conscious behavior, but education and career were not. When subjects were older and/or had a lower income, they were more likely to purchase socially conscious products. From his study, Roberts concluded two important findings: 1) there was a

large segment of socially responsible consumers, and 2) demographic characteristics could not predict socially responsible consumers' behavior well.

Dickson (2001) examined whether consumers' apparel purchasing decision was influenced by the apparel label guaranteeing good working condition during garment production. Two thousand mail surveys were randomly and proportionately distributed based on the geographic population. A 30 percent response rate was achieved. An ordinary least square regression and part-worth utilities for each subject were used in a k-means cluster analysis to categorize individuals into market segment based on their characteristics. Results indicated that only a small proportion of consumers would be influenced by the label. Dickson categorized his consumer segment based on consumers' demographic and psychographic characteristics. Specifically, this study found that the "No Sweat" label was preferred more by women than men. In addition, consumers with a lower level of education were more likely to make their purchasing decisions based on the label; however, consumers' income level did not have influence on whether or not the label affected a consumer's purchasing decision.

2.8 Summary of Consumer Studies

The review of the consumer studies suggests the effectiveness of using a cheap talk script in increasing the degree of accuracy in estimating consumers' preferences. Studies measuring consumers' WTP for various product attributes suggested that consumers were generally willing to pay more for organic, hormone-free, animal-friendly, environmental-friendly, and locally grown products. However, many of these studies focused on food consumption. This research aims to find out if similar findings are applicable to apparel consumption. Moreover, the trade-

offs between organic and animal-friendly farming practices and between organic and locally grown product, i.e., consumers' awareness about environmental benefits close to home versus abroad, which have not been previously studied, will be examined.

CHAPTER 3 - Methodology

3.1 Survey Design and Choice Experiment

Consumer preferences can be studied through revealed or stated preferences. The revealed preference techniques include hedonic analysis and travel cost method, where actual consumers' responses are used to model consumers' preferences for market and non-market goods. The stated preference techniques, such as contingent valuation, contingent behavior, and choice experiments, collect data from participants' preferences in hypothetical settings. Thus, the stated preference method is believed to work better when estimating demand for new products, products with new features, or products not traded in the real market (Louviere, Hensher, and Swait, p. 21, 2000). Although stated preference method is always questionable for being able to elicit actual consumers' behaviors accurately due to the hypothetical nature of survey questions (Cummings, Brookshire, and Schulze, 1986; Mitchell and Carson, 1989), revealed preference methods may suffer from co-linearity among attributes precluding the identification of the marginal impact of relevant factors (Loureiro, McCluskey, and Mittelhammer, 2003). Indeed, Loureiro, McCluskey, and Mittelhammer (2003) compared survey responses and market behaviors of the same individuals and found that stated preferences predicted actual market behavior. Here, organic wool and wool with animal-friendly and environment-friendly attributes can be viewed as an unfamiliar product to the general public. Therefore, stated preference data rather than revealed preference data will be collected and analyzed in this research.

The three most common procedures to measure consumer WTP or economic value for their preferences, used in practice are: personal interviews, written surveys, and experimental auctions

(Umberger et al., 2000). Since the existence of hypothetical bias, experimental auction is more and more popular in estimating WTP, and experimental auctions have the potential to provide more trustworthy measurements of consumer WTP than hypothetical surveys (Lusk et al., 1999). However, it usually involves with giving incentive, which may introduce bias into bids and limiting the sample size. Furthermore, the bids may also be influenced by other substitutes, and zero bidding maybe easy to observe (Lusk and Hudson, 2004). Personal interviews are preferred when researching a specific target population. The method is known for high response rates, but it is also expensive, time-consuming, and cannot easily represent the population as a whole. To obtain representative preferences based on a modest budget, this study will use surveys to obtain consumers' willingness-to-pay values for wool products with different attributes.

Lusk and Hudson (2004) mention dichotomous choice questions and choice-based contingent valuation as the most common methods to measure WTP along with experimental auctions just discussed. The dichotomous choice questions are frequently used to measure the value of non-market goods, and are less frequently used to measure the value for new commodity. Both single- and double-bounded dichotomous choice questions were found with the following two disadvantages: First, both methods only concern WTP for a single commodity. Second, these approaches only allow for inspecting if a subject would pay more or less than a certain price. Therefore, this measurement is not suitable for this research.

Contingent valuation and choice-based experiments are the most commonly seen applications in surveys to obtain WTP. In contingent valuation, participants are asked to state their WTP for a non-market good, which is traded in a hypothetical market (Mitchell and Carson, 1989). The greatest advantage of using contingent valuation is the ease of analysis. In the choice-based conjoint analysis, respondents choose alternatives not in terms of the marginal rates

of substitution between commodities, but according to their preferences of attributes on these products (Kimenju, Morawetz, and De Groote, 2005). According to Louviere, Hensher, and Swait (p. 17, 2000), product attributes can be varied in choice experiments enabling the effects of each attribute to be identified. The responses from choice experiments can be analyzed based on random utility theory (Thurstone, 1927) and Lancaster's theory of utility maximization (Lancaster, 1966). Choice-based experiment is more suited to address the research objective to find consumers' WTP for the same wool product with different attributes. Moreover, using choice-based experiments can predict participants' choices by determining the relative importance of various attributes in their choice process (Hanemann and Kanninen 1998).

A choice-based conjoint experiment asks sampled individuals to choose their most preferred alternative from choice sets comprising of a number of alternatives with pre-specified attributes. Individuals can be allowed to choose none of the alternatives in a given choice set. Each choice set will be specified with four alternatives (wool products A, B, C, and acrylic), and each product alternative will be specified with four attributes (price, COO, and two production attributes). The attributes are discussed in detail below.

In addition, Lusk and Norwood (2005) examined the effect of choice experimental design. Choice experiments offer researchers the ability to select the choice sets. However, it is always challenging to determine the statistical design of choice questions. The authors used a Monte Carlo framework to evaluate the impacts of choice experimental design on willingness-to-pay with defined true utility parameters. They generated data from competing experimental designs, and then employed a true utility function to generate simulated choices for the multinomial logit models. They had six different experimental designs with different degrees of inference on willingness-to-pay estimation accuracy. Their results indicated that designs with incorporated

attribute interaction effects can estimate willingness-to-pay better than designs without the interaction effects. They also found that a large experimental design did not guarantee better performance than a design that minimized an efficiency criterion. Therefore, their contributions suggested researchers could simplify a survey without losing the credibility of welfare estimation. Therefore, even there are 18 alternatives and 816 potential sets that can be used in this study, only the most relative and efficient sets were selected in the survey.

Similar to Lusk (2003), this research will include information about animal welfare and environmental issues associated with wool production, which most consumers are likely not aware, in one-third of our survey. Details of survey design, choice experiment, and theoretic model are as follows.

3.1.1 Mail Survey

A copy of the survey used in this research can be found in the Appendix. The first page of survey described the purpose of this research and encouraged participants to complete and send back the surveys. The survey itself was divided into three sections. In the first section, questions were asked concerning (1) respondents' apparel shopping habits, preferences on wool products, familiarity with organic products and environmental damages when manufacturing or dyeing fabric, (2) respondents' opinions towards animal right, recycling, country-of-origin, locally grown, and (3) the frequency in which respondents tried new restaurants.

The second section of the survey consisted of choice sets. In order to minimize gender and fashionable biases, gloves were the chosen wool product that respondent were asked to value. Prior to the valuation section, a short paragraph introduced the super-fine wool and attribute (e.g., absence of allergens and cleaning instructions).

There were six choice sets in the choice experiment, and each set contained four alternatives. The first three wool products, pairs of gloves, each contained the following four attributes: COO of wool (U.S. or Australia), two out of the three processing attributes (organic, animal-friendly, and environment-friendly), and the unit price ($7.50, $8.25, or $8.70). The fourth product was described as acrylic and had the cheapest price ($6.75). Using $7.50 as the base, prices were determined by increasing the base price by ten percent and twenty percent. Price for the acrylic product was obtained by decreasing the base price by ten percent. An orthogonal design was used to select the 6 choice sets. Table 3.1 provides an example of a choice set.

Table 3.1 Example of a Choice Set in the Mail Survey

Product A	Product B	Product C	Product D
AU* wool	US wool	US wool	
Organic	Pro-Animal	Organic	Acrylic
Pro-Animal	Pro-Environment	Pro-Environment	
$8.25	$7.50	$8.70	$6.75

** AU denoted Australia.*

The final section of the survey consisted of demographic questions, which included zip code, gender, marital status, age, race, household members' age distribution, the highest education level obtained, income. In addition, subjects were also asked questions concerning their allergy condition and pet's ownership, to determine a link between people who concern about animal welfare and people who own pets at home.

Table 3.2 describes the three different survey versions used in this research. Version A was defined as the survey version that did not provide any information about attributes in the choice set. Version B provided brief definitions about the five production attributes (US, AU, organic, pro-animal, and pro-environment, Table 3.3). Version C was an extension of version B and included several short paragraphs that explained the current difficulties of raising sheep

organically as well as provided suggestion for less stringent production practices, which would allow for pro-animal or pro-environment product claims. In addition, version C also offered information on country-of-origin and how Australia's practices have led to their poor animal welfare reputation. The following passages are the paragraphs provided in version C:

> *Organic farming and manufacturing practices limit the use of synthetic substances to those approved by the National Organic Standards. Besides the organic standards, there are other ways to produce wool that can be considered pro-environment. Producers who find it challenging to adhere to the organic standards can adopt less stringent production practices and still claim that their products are pro-environment.*
>
> *When people who raise sheep organically treat the sheep for worms using anti-parasite drugs, the wool from the sheep is no longer considered organic under current standards. Since worms are common, this makes it difficult to produce organic wool. Some people believe that failing to give the sheep the most effective treatment for worms is cruel to the sheep.*
>
> *Country-of-origin tells us where the fiber production is taking place. If an organic or pro-environment production process is being used, the country-of-origin tells us which environment is directly benefiting from such production practices. Moreover, some people are concerned about the environmental impact of transporting products over long distances.*
>
> *Mulesing is an important part of husbandry in Australia, where the skin around the backside is surgically removed to prevent fly strike caused by Australian blowfly. The process of mulesing has been reported to mutilate many sheep by trussing the animals upside-down and carving large pieces of flesh from their rumps without any pain relief medication.*

Table 3.2 Information Contents in Different Survey Versions

Survey Versions	Information Contents
A	None
B	Definitions of attributes
C	Definitions of attributes and paragraphs of information

Table 3.3 Definitions of Wool Production Attributes

Labels:	Descriptions:
US Wool	Super-fine wool from sheep that were raised and shorn in U.S.
AU Wool	Super-fine wool from sheep that were raised and shorn in Australia.
Organic	Wool that was produced and processed into yarn according to the National Organic Standards regulated by the US Department of Agriculture.
Pro-Animal	Wool that was shorn with care from sheep that were treated humanely, with respect for their physical and mental wellness.
Pro-Environment	Wool that was produced and processed using methods with minimum impact on the environment, which may be more or less stringent than the organic standards.

3.1.2 On-line Survey

In addition to the mail survey, an on-line based survey was also conducted. There were three slight modifications between the two types of surveys. First, a "don't know" was added as a possible response to the question concerning respondent's knowledge about environmental damages caused from activities such as growing cotton, raising sheep, manufacturing polyester, manufacturing rayon fiber, dyeing cotton fabric, and dyeing polyester fabric, as well as for the question concerning subjects' belief about animal right. This modification was based on the comments received from mail surveys. Second, the predator-friendly attribute was added into choice alternatives to increase variability in responses. This attribute indicates the wool is a product of sheep raised by producers who do not kill native predators on their land. The final

modification was the price of acrylic was changed to be the same price as the cheapest wool product. Therefore, the survey could examine consumers' preferences between the cheapest wool and acrylic. An example of a choice set offered in the on-line survey is presented in Table 3.4.

Table 3.4 Example of a Choice Set in the On-line Survey

Product A	Product B	Product C	Product D
US wool	AU wool	AU wool	
Pro-Environment	Pro-Environment	Organic	Acrylic
Pro-Animal	Predator Friendly	Pro-Animal	
$8.70	$8.25	$7.50	$7.50

Given the research budget, the on-line survey only contained version A and C (Table 3.2).

3.2 Survey Data Collection

3.2.1 Mail Survey

The mail survey included a cover letter and a business-size, postage-paid returning envelope with a tracking number. Depending on the survey version, the instrument was six or seven double-sided pages. The first survey mailing was sent to 2,400 (800 for each version of survey) households in the United States in November 2006. No incentive was included in this survey. The mailing list was purchased from a database company, where the participants were randomly chosen from a pool of consumers who had indicated an interest in wine, cultural activities, and antique. The justification for this additional filtering was to obtain responses to consumers who were likely familiar with organic products. At the same time, it certainly could have confined our sample to a segment of the population that was distinct from the general population. To

obtain geographically representative results, the surveys were sent to each state, based on the percentage of state populations in the national population. In order to increase the response rate, a second mailing, which contained the same materials as the first mailing was sent one month later to non-respondents from the first mailing as a reminder to complete the survey. Thirty-two surveys were returned because of undeliverable addresses or the survey recipients were deceased. A total of 701 usable surveys were received, which represented a 29.21 percent response rate and a wide range of demographics from all fifty-one states and the District of Columbia. The summary for the number of responses and the response rates for different versions and mailings are presented in Table 3.5. Version C had the highest response rate, followed closely by version A and then version B.

Table 3.5 Number of Responses and Response Rate for Three Survey Versions and Two Mailings

	Survey Versions			
	A	B	C	Total
First mailing	166	143	182	491
	(6.92%)	(5.96%)	(7.58%)	(20.46%)
Second mailing	63	77	70	210
	(2.63%)	(3.21%)	(2.92%)	(8.75%)
Total	229	220	252	701
	(9.54%)	(9.17%)	(10.50%)	(29.21%)

3.2.2 On-line Survey

The on-line survey, with slight modification from the mail survey, was administered in October 2007. The length of instrument was eight pages for version A and twelve pages for version C. Unlike the mail survey, the on-line survey was randomly sent to subjects in the U.S. without considering geographically representative issues or their personal interests. The panel of

consumers was purchased from the marketing research company, Zoomerang, which gave the participants an incentive after they completed the survey and visited the Zoomerang site. The participants represented forty-six states[2]. A total of 514 completed responses were received, which represented a 88 percent completion rate. Similar to the mail survey sample, the use of the research company's panel might have been restricted our sample to a certain segment of the population.

3.3 Descriptive Statistics on Survey Respondents

3.3.1 Mail Survey

The demographic response results are reported in Table 3.6, and the geographic division and regions are defined in Table 3.7. Geographically speaking, the survey respondents were more concentrated in the Midwest (30.53 percent) and the South (29.39 percent) regions. Responses from these regions were five percentage points higher than expected. Conversely, the Northeast region had responses that were eight percentage points lower than expected. More specifically, the subjects who completed the survey were least likely to be from New England (4.14 percent) and the East South Central divisions (5.42 percent), and were most likely from the East North Central division (21 percent). Even though, 26.57 percent of surveys were sent to the East South Central division, only 5.42 percentages of responses were from this division,

[2] The responses were not received from the following states: Alaska, Hawaii, New Hampshire, and Wyoming.

suggesting lowest response rate among the division. This implies that people from this area were not as interested in participating research in wool products as people from other divisions.

The numbers of responses from female and male were similar, consistent with the U.S. Census 2000 (Table 3.8). The majorities of respondents were married (69.8 percent), white (87.2 percent), and between the age of 45 to 84(74.4 percent). Compared to the U.S. Census 2000, we had 15.4 percentage points more married subjects, 18.1 percentage points more white participants, and 41.5 percentage points more subjects who were between 45 to 84 years old. In this study, participants' average age was older than the average age of the U.S. total population, which indicated that people who had shown interests in wine, culture, and antique were more likely to be older. Fifty-seven percent of the sample had at least completed a degree from a four years college, which compared to the U.S. population in 2000 (24.4 percent) suggested the participants in this research were more highly educated. One third of subjects' household income was between $35,000 ~ $74,999, which was similar to the percentage of the total U.S. population within the same income basket (36 percent). In addition, sixty-two percent of participants had pets at home and the same percentage of responses indicated that they had some type of allergy; 6.18 percent were allergic to fiber material, and 17.39 percent of had allergy to chemicals.

For psychographic variables with a 5-point scale question, the average response of 3.56 implied that most participants, to some degree, believed in animal rights. Responses from the survey also indicated that most subjects recycled at home (4.03 out of 5), preferred U.S. products

Table 3.6 Demographic Distribution of Responses from the Mail Survey

Versions of Survey	Number of Responses				Percentage of Response			
Variable	A	B	C	All	A	B	C	All
Division								
1.New England	14	5	10	29	6.11%	2.27%	3.97%	4.14%
2.Middle Atlantic	32	30	32	94	13.97%	13.64%	12.70%	13.41%
3.East North Central	37	55	56	148	16.16%	25.00%	22.22%	21.11%
4.West North Central	25	20	21	66	10.92%	9.09%	8.33%	9.42%
5.South Atlantic	32	33	50	115	13.97%	15.00%	19.84%	16.41%
6.East South Central	11	13	14	38	4.80%	5.91%	5.56%	5.42%
7.West South Central	19	19	15	53	8.30%	8.64%	5.95%	7.56%
8.Mountain	19	19	21	59	8.30%	8.64%	8.33%	8.42%
9.Pacific	40	26	33	99	17.47%	11.82%	13.10%	14.12%
Total	229	220	252	701				
Regions								
Northeast	46	35	42	123	20.09%	15.91%	16.67%	17.55%
Midwest	62	75	77	214	27.07%	34.09%	30.56%	30.53%
South	62	65	79	206	27.07%	29.55%	31.35%	29.39%
West	59	45	54	158	25.76%	20.45%	21.43%	22.54%
Total	229	220	252	701				
Gender								
Male	116	107	131	354	51.10%	49.08%	51.98%	50.79%
Female	111	111	121	343	48.90%	50.92%	48.02%	49.21%
Total	227	218	252	697				
Marital								
Single	35	28	43	106	15.42%	12.84%	17.13%	15.23%
Married	162	155	169	486	71.37%	71.10%	67.33%	69.83%
Separated	2	5	0	7	0.88%	2.29%	0.00%	1.01%
Widowed	16	13	17	46	7.05%	5.96%	6.77%	6.61%
Divorced	12	17	22	51	5.29%	7.80%	8.76%	7.33%
Total	227	218	251	696				
Age								
18~24	4	2	3	9	1.76%	0.92%	1.20%	1.29%
25~44	44	55	58	157	19.38%	25.23%	23.11%	22.56%
45~59	93	79	84	256	40.97%	36.24%	33.47%	36.78%
60~84	83	80	99	262	36.56%	36.70%	39.44%	37.64%
85 and older	3	2	7	12	1.32%	0.92%	2.79%	1.72%
Total	227	218	251	696				

Table 3.6 Demographic Distribution of Responses from the Mail Survey (Continued)

Versions of Survey / Variable	Number of Responses				Percentage of Response			
	A	B	C	All	A	B	C	All
Race								
White	199	190	216	605	87.67%	87.56%	86.40%	87.18%
Black/African American	7	7	9	23	3.08%	3.23%	3.60%	3.31%
Hispanic	7	6	8	21	3.08%	2.76%	3.20%	3.03%
American Idian/Alaska Native	1	1	0	2	0.44%	0.46%	0.00%	0.29%
Asian	4	4	10	18	1.76%	1.84%	4.00%	2.59%
NH/PI	5	0	0	5	2.20%	0.00%	0.00%	0.72%
Other	4	9	7	20	1.76%	4.15%	2.80%	2.88%
Total	227	217	250	694				
Education								
Elementary	1	1	2	4	0.44%	0.45%	0.80%	0.57%
High school	58	34	44	136	25.44%	15.45%	17.60%	19.48%
2-year college	50	52	58	160	21.93%	23.64%	23.20%	22.92%
4-year college	62	64	71	197	27.19%	29.09%	28.40%	28.22%
Graduate school	57	69	75	201	25.00%	31.36%	30.00%	28.80%
Total	228	220	250	698				
Household Income								
Less than $14,999	7	6	7	20	3.50%	2.88%	3.06%	3.14%
$15,000 ~ $24,999	17	11	14	42	8.50%	5.29%	6.11%	6.59%
$25,000 ~ $34,999	22	11	27	60	11.00%	5.29%	11.79%	9.42%
$35,000 ~ $74,999	66	70	79	215	33.00%	33.65%	34.50%	33.75%
75,000 ~ $99,999	35	53	35	123	17.50%	25.48%	15.28%	19.31%
100,000 ~ $149,999	35	38	42	115	17.50%	18.27%	18.34%	18.05%
More than $150, 000	18	19	25	62	9.00%	9.13%	10.92%	9.73%
Total	200	208	229	637				
Pets								
Has pet	140	148	146	434	71.99%	75.09%	66.45%	62.27%
No pet	86	72	105	263	28.01%	24.91%	33.55%	37.73%
Total	226	220	251	697				
Allergy								
Has allergy	137	134	162	433	79.82%	80.00%	81.41%	62.21%
Allergy to fiber	15	16	12	43	3.33%	3.76%	2.56%	6.18%
Allergy to chemical	44	32	45	121	9.76%	7.53%	9.62%	17.39%
No allergy	91	85	87	263	20.18%	20.00%	18.59%	37.79%
Total	228	219	249	696				

Table 3.7 Definitions for Regions and Divisions

Region 1: Northest	
Division 1: New England	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
Division 2: Middle Atlantic	New Jersey, New York, Pennsylvania
Region 2: Midwest	
Division 3: East North Central	Indiana, Illinois, Michigan, Ohio, Wisconsin
Division 4: West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
Region 3: South	
Division 5: South Atlantic	Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
Division 6: East South Central	Alabama, Kentucky, Mississippi, Tennessee
Division 7: West South Central	Arkansas, Louisiana, Oklahoma, Texas
Region 4: West	
Division 8: Mountain	Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada, Wyoming
Division 9: Pacific	Alaska, California, Hawaii, Oregon, Washington

Source: United States Census Bureau

over products from other countries (4.12 out of 5), and showed support towards local businesses (3.4 out of 5). However, the majority of the respondents were not willing to try a new restaurant within one week of its opening (1.67 out of 5). From the 4-point scaled questions, the average responses of 3.35, 2.2 and 2.05 indicated subjects' familiarities of organic foods, organic cotton, and organic wool, respectively. The respondents believed that manufacturing artificial fibers (e.g., polyester and rayon) could cause more environmental damages than growing cotton. With respect to apparel shopping, machine washable and price were the most important criteria affecting respondents' purchasing decisions, whereas organic certified and designer brand were the least important.

Table 3.8 Demographic Characteristics of the United States (2000)

Characteristics	% Frequency
Sex	
Male	49.1 %
Female	50.9
Marital Status	
Single	27.1 %
Married	54.4
Separated	2.2
Widowed	6.6
Divorce	9.7
Age	
Under 24 years	35.3 %
25 to 44 years	30.2
45 to 59 years	18.2
60 to 84 years	14.7
85 and Over	1.5
Education	
Less than 9th grade	7.5 %
High school graduate (including equivalency)	28.6
Associate degree	6.3
Bachelor's degree	15.5
Graduate or professional degree	8.9
Household Income	
Less than $14,999	15.8 %
$15,000 to $24,999	12.8
$25,000 to $34,999	12.8
$35,000 to $74,999	36.0
$75,000 to $99,999	10.2
$100,000 to $149,999	7.7
$150,000 and over	4.6

Source: United States Census Bureau, Census 2000.

3.3.2 On-line Survey

Similar to the mail survey, most of the participants were from the Midwest (30.54 percent) and the South (29.96 percent) regions (Table 3.9). Eight percentage point higher responses were received from the Midwest than expected, but six percentage point fewer responses were received from the South region than expected. In addition, most of the participants were from East North Central (19.46) division. The response from New England (5.25 percent) and the East South Central divisions (5.45 percent) were the lowest, which is consistent with the mail survey results (Table 3.6). The distributions were not very different from the U.S. total population (Table 3.10) with only 0.02 percent to 5.5 percentage points of differences. Unlike the mail survey and the total U.S. population, the on-line survey's sample included more than twice as many female respondents (70.23 percent) as male participants (29.77 percent).

The majority of online survey respondents were married (45.33%), white (86.96%), and between the age of twenty-five and forty-four (41.63%). The proportions of the subjects' martial and race status were similar to findings from the mail survey, and consistent with the results of the U.S. Census 2000. However, the on-line survey participants were found to be younger than the mail survey participants, which reinforced the finding that older people seem to be interested in wine, cultural activities, and antiques than younger consumers. The findings also could be explained by the fact that younger population used the Internet more than older population. The mail survey participants were found to be on average more educated than the participants from the on-line survey. Approximately fifty percent of respondents completed a college (2-year or 4-year college) degree, which is higher than percentage of the total U.S. population. The results also indicated that about one third of the on-line survey respondents had an income level between $35,000 ~ $74,999, which is consistent with the results from the mail survey, and is four

percent less than the U.S. total populations. More subjects of the on-line survey owned a pet (75.39 percent), but fewer had allergies (49.61 percent), compared to the mail survey sample. In sum, more females and people with less education participated in the on-line survey than mail survey. Otherwise, there were no notable differences in demographic composition were found between the mailing and the on-line sample.

With respect to psychographic characteristics, findings for participants' beliefs in animal rights (3.83 out of a 5-point scale) were slightly higher than the mail survey's participants. However, results from the on-line sample indicated that respondents recycled (3.64) less, preferred domestic products (3.85) less, and supported local businesses (3.10) than their counterparts in the mail survey. Likewise to the mail survey, most of respondents were not willing to try a new restaurant within its first week of business (2.09); however, the average response was higher than the mailing sample by 0.42.

Based on the 4-point scaled questions, the average responses of 2.86, 2.10 and 1.99 indicated subjects' familiarities of organic foods, organic cotton, and organic wool, respectively. The on-line respondents were less familiar with organic version products than the mail survey respondents. Consistent with the findings from the mail survey, the on-line survey respondents believed that manufacturing artificial fibers (e.g., polyester and rayon) could cause more environmental damage than producing natural fibers (e.g., cotton and wool). In summary, the on-line survey participants' psychographic characteristics were similar to the mail survey participants. In addition, the participants also indicated that price and machine washable were the most important criteria to affect their purchasing decisions, while organic certified and designer label were the least important. This finding is the same as the results from the mail survey.

Table 3.9 Demographic Distribution of Responses from the On-line Survey

Versions of Survey	Number of Responses			Percentage of Response		
Variable	A	C	All	A	C	All
Division						
1.New England	13	14	27	5.04%	5.47%	5.25%
2.Middle Atlantic	46	45	91	17.83%	17.58%	17.70%
3.East North Central	54	46	100	20.93%	17.97%	19.46%
4.West North Central	32	25	57	12.40%	9.77%	11.09%
5.South Atlantic	36	47	83	13.95%	18.36%	16.15%
6.East South Central	17	11	28	6.59%	4.30%	5.45%
7.West South Central	22	21	43	8.53%	8.20%	8.37%
8.Mountain	16	16	32	6.20%	6.25%	6.23%
9.Pacific	22	31	53	8.53%	12.11%	10.31%
Total	258	256	514			
Regions						
Northeast	59	59	118	22.87%	23.05%	22.96%
Midwest	86	71	157	33.33%	27.73%	30.54%
South	75	79	154	29.07%	30.86%	29.96%
West	38	47	85	14.73%	18.36%	16.54%
Total	258	256	514			
Gender						
Male	85	68	153	32.95%	26.56%	29.77%
Female	173	188	361	67.05%	73.44%	70.23%
Total	258	256	514			
Marital						
Single	94	95	189	36.43%	37.11%	36.77%
Married	120	113	233	46.51%	44.14%	45.33%
Separated	7	11	18	2.71%	4.30%	3.50%
Widowed	8	10	18	3.10%	3.91%	3.50%
Divorced	29	27	56	11.24%	10.55%	10.89%
Total	258	256	514			
Age						
Under 25	54	67	121	20.93%	26.17%	23.54%
25~44	102	112	214	39.53%	43.75%	41.63%
45~59	71	37	108	27.52%	14.45%	21.01%
60~84	30	36	66	11.63%	14.06%	12.84%
85 and older	1	4	5	0.39%	1.56%	0.97%
Total	258	256	514			

Table 3.9 Demographic Distribution of Responses from the On-line Survey (Continued)

Versions of Survey / Variable	Number of Responses			Percentage of Response		
	A	C	All	A	C	All
Race						
White	224	223	447	86.82%	87.11%	86.96%
Black/African American	12	7	19	4.65%	2.73%	3.70%
Hispanic	7	8	15	2.71%	3.13%	2.92%
American Indian/Alaska Native	3	0	3	1.16%	0.00%	0.58%
Asian	5	6	11	1.94%	2.34%	2.14%
Native Hawaiian and Other Pacific Islander	0	1	1	0.00%	0.39%	0.19%
Other	7	11	18	2.71%	4.30%	3.50%
Total	258	256	514			
Education						
Elementary	2	4	6	0.78%	1.56%	1.17%
High school	103	110	213	39.92%	42.97%	41.44%
2-year college	64	57	121	24.81%	22.27%	23.54%
4-year college	69	69	138	26.74%	26.95%	26.85%
Graduate school	20	16	36	7.75%	6.25%	7.00%
Total	258	256	514			
Household Income						
Less than $14,999	38	47	85	14.73%	18.36%	16.54%
$15,000 ~ $24,999	64	59	123	24.81%	23.05%	23.93%
$25,000 ~ $34,999	33	47	80	12.79%	18.36%	15.56%
$35,000 ~ $74,999	91	73	164	35.27%	28.52%	31.91%
75,000 ~ $99,999	15	11	26	5.81%	4.30%	5.06%
100,000 ~ $149,999	10	15	25	3.88%	5.86%	4.86%
More than $150, 000	7	4	11	2.71%	1.56%	2.14%
Total	258	256	514			
Pets						
Has pet	181	193	374	72.76%	70.16%	75.39%
No pet	77	63	140	27.24%	29.84%	24.61%
Total	258	256	514			
Allergy						
Has allergy	126	129	255	48.84%	50.39%	49.61%
Allergy to fiber	7	19	26	2.71%	7.42%	5.06%
Allergy to chemical	20	26	46	7.75%	10.16%	8.95%
No allergy	132	127	259	51.16%	49.61%	50.39%

Table 3.10 Comparisons Between the On-line Survey Responses and the U.S. Total Population by Geographic Regions and Divisions

Regions	Received	Expected
Northeast	118	97.62
Midwest	157	115.27
South	154	184.82
West (including Alasak and Hawaii)	85	114.07
Division		
New England	27	26.90
Middle Atlantic	91	70.73
East North Central	100	80.72
West North Central	57	34.54
South Atlantic	83	95.80
East South Central	28	30.65
West South Central	43	58.37
Mountain	32	32.80
Pacific	53	81.28

CHAPTER 4 - Model

4.1 WTP for Wool Product Attributes

4.1.1 Econometric Model

Similar to predicting consumer segments, survey responses are examined based on the random utility theory (Thurstone, 1927). Louviere, Hensher, and Swait (2000) indicate three factors that need to be taken into consideration: 1) a choice set, 2) observed attributes and decision rules of combining them, and 3) model of individuals' choice and behavior and distribution of behavior patterns in the population. Let U_{iq} be the utility derived from the qth alternative for the ith individual. According to the random utility theory (Thurstone, 1927), it can be written as:

$$U_{iq} = V_{iq} + \varepsilon_{iq}, \tag{4.1.1.1}$$

where V_{iq} is the representative utility, also known as systematic component, and ε_{iq} is the random component, which also represents the unobserved individual characteristics. V_{iq} can be written further as:

$$V_{iq} = \sum_{k=1}^{K} \beta_{ik} S_{iqk} + \sum_{n=1}^{N} \phi_{in} X_{iqn}, \tag{4.1.1.2}$$

where the β_{ik}s are utility parameters for the qth alternative with k attributes. The ϕ_{in}s are also utility parameters for qth alternative that was chosen by individual i with characteristic n, which weights nth characteristic. Both β_{ik}s and ϕ_{in}s are assumed to be the same across all individuals i. Thus, β_{ik} can be simplified to β_k and ϕ_{in} to ϕ_n. In the other words, V is a linear utility function,

which represents characteristics of wool items and individuals, where, S_{iqk} is the *k*th attribute of choice *q* for *i*th subject and X_{iqn} is the *n*th characteristic of individual *i* who choose *q*. Then, equation (4.1.1.2) can be rewritten as:

$$V_{iq} = \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} \quad . \tag{4.1.1.3}$$

The subject will choose the choice *q* over *j* only if

$$U_{iq} > U_{ij} \tag{4.1.1.4}$$

, for all $j \neq q \in$ B, where B is the choice set available for subjects. Equation (3.1.4) implies

$$V_{iq} + \varepsilon_{iq} > V_{ij} + \varepsilon_{ij}\,, \tag{4.1.1.5}$$

,which can be rearranged as:

$$V_{iq} - V_{ij} > \varepsilon_{ij} - \varepsilon_{iq}\,. \tag{4.1.1.6}$$

Since $\varepsilon_{ij} - \varepsilon_{iq}$ cannot be observed, equation (4.1.1.6) cannot be determined neither. Only the probability of the condition where $V_{iq} - V_{ij} > \varepsilon_{ij} - \varepsilon_{iq}$ occurs can be calculated. Equation (4.1.1.7) represents the probability (Pr_{iq}) that the individual *i* will prefer choice *q* rather than choice *j*:

$$\Pr_{iq} = \Pr\left[\left(\varepsilon_{ij} - \varepsilon_{iq}\right) < \left(V_{iq} - V_{ij}\right)\right] = \Pr\left[\varepsilon_{ij} < \varepsilon_{iq} + V_{iq} - V_{ij}\right]. \tag{4.1.1.7}$$

The Independence-from-Irrelevant Alternatives (IIA) axiom states that introducing a third irrelevant, alternative X into a choice set {A,B} will not change the original preferred status between A and B. The IIA axiom implies that *the ratio of the probabilities of choosing one alternative over another (given that both alternatives have a non-zero probability of choice) is unaffected by the presence or absence of any additional alternatives in the choice set* (Louviere, Hensher, and Swait, p. 44, 2000). With the IIA conditions, it is more convenient to compute the

choice model and feasible to introduce or eliminate the alternatives from choice sets without re-estimating. IIA also implies the random elements in utility function such as *s*, ϕ, and ε are independent across alternatives and are identically distributed. Assuming that the errors are distributed according to the extreme value type 1 distribution

($\Pr(\varepsilon_{ij} \le \varepsilon) = \exp(-\exp-\varepsilon) = e^{-e^{-\varepsilon}}$), the equation (3.1.7) then can be presented as:

$$\Pr_{iq} = \Pr(\varepsilon_{ij} < b + V_{iq} - V_{ij}) = \prod_{j=1}^{J} \exp(-\exp-(b + V_{iq} - V_{ij})) = \exp(-b)\exp\left[-\sum_{j=1}^{J} \exp-(b + V_{iq} - V_{ij})\right]$$

, for all $j \neq q$, and b is a given value for ε_{iq} . (4.1.1.8)

The probability density function of equation (3.1.8) can be integrated over all possible values of ε to calculate probability of individual *i* choosing alternative *q*:

$$\Pr_{iq} = \int_{b=-\infty}^{b=\infty} \exp(-b)\exp\left[-\sum_{j=1}^{J} \exp-(b + V_{iq} - V_{ij})\right] db = \frac{1}{\sum_{j=1}^{J} \exp-(V_{iq} - V_{ij})}. \quad (4.1.1.9)$$

Equation (4.1.1.9) is also known as conditional logit choice or multinomial logit model, which can be simplified to equation (4.1.1.10):

$$\Pr_{iq} = \frac{\exp(V_{iq})}{\sum_{j=1}^{J} \exp(V_{ij})}.$$

(4.1.1.10)

Now, in order to be able to obtain estimates for consumers' willingness-to-pay (WTP), equation (4.1.1.3) can be expressed as:

$$V_{iq} = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} , \quad (4.1.1.11)$$

where the α_q is a utility parameter for price (P_{iq}) of the *q*th alternative that is chosen by individual *i*.

In order to examine how the subject's demographic and psychographic characteristics affect its choices, the characteristics is included in a conditional logit model through interaction terms with the attributes. In addition, the version variable is imposed to investigate how information provided within the survey affects consumers' choices through interaction terms as well. Therefore, the utility function can be redefined as:

$$V_{iq} = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{k=1}^{K} \gamma_{1k} S_{iqk} Ver_{iq} + \sum_{k=1}^{K} \gamma_{2k} S_{iqk} X_{iqn} + \sum_{k=1}^{K} \gamma_{3k} S_{iqk} X_{iqn} Ver_{iq}$$

$$+ \sum_{k=1}^{K} \gamma_{4k} P_{iq} Ver_{iq} + \sum_{k=1}^{K} \gamma_{5k} P_{iq} X_{iqn} + \sum_{k=1}^{K} \gamma_{6k} P_{iq} X_{iqn} Ver_{iq} \,, \qquad (4.1.1.12)$$

where γ_1, γ_2, γ_3, and γ_4 represent parameters of interaction terms, and *Ver* is a version variable. The interaction terms then can be used to account how preference of attributes related to survey versions and individual characteristics (Kallas, G´omez-Lim´on, and Arriaza, 2007). To simplified, the equation can be write as:

$$V_{iq} = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{m=1}^{3} \sum_{k=1}^{K} \gamma_{mk} S_{iqk} Z_{iqnm} + \sum_{m=4}^{6} \sum_{k=1}^{K} \gamma_{mk} P_{iq} Z_{iqnm} \,, \qquad (4.1.1.13)$$

where Z_{iqnm} represents individual characteristic and/or survey version variable.

Since consumers are assumed to chose alternative *q* over *j* because the *k*th attribute is preferred in *q* than in *j* alternative, thus, $V_{iq} > V_{ij}$. Now, assuming that consumers are willing to pay a price premium (WTP_k.) for alternative *q*, V^2_{iq} equals V_{ij}, and P^2_{iq} is the sum of P_{ij} and WTP_k. Here, V^2_{iq} represents the new utility, where consumers pay more at price level P^2_{iq}. Thus,:

$$V^2_{iq} = \alpha_q (P_{ij} + WTP_k) + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{m=1}^{3} \sum_{k=1}^{K} \gamma_{mk} S_{iqk} Z_{iqnm} + \sum_{m=4}^{6} \sum_{k=1}^{K} \gamma_{mk} \left(P_{ij} + WTP_k\right) Z_{iqnm}$$

$$= V_{ij} = \alpha_j P_{ij} + \sum_{k=1}^{K} \beta_k S_{ijk} + \sum_{n=1}^{N} \phi_n X_{ijn} + \sum_{m=1}^{3} \sum_{k=1}^{K} \gamma_{mk} S_{ijk} Z_{ijnm} + \sum_{m=4}^{6} \sum_{k=1}^{K} \gamma_{mk} P_{ij} Z_{ijnm} \qquad (4.1.1.14)$$

$$\alpha_q(P_{ij}+WTP_k)+\sum_{\substack{l=1\\l\neq k}}^{K-1}\beta_l S_{iql}+\beta_k S^2_{iqk}+\sum_{n=1}^{N}\phi_n X_{iqn}+\sum_{m=1}^{3}\sum_{\substack{l=1\\l\neq k}}^{K-1}\gamma_{ml}S_{iql}Z_{iqnm}+\sum_{m=1}^{3}\gamma_{mk}S^2_{iqk}Z_{iqnm}$$

$$+\sum_{m=4}^{6}\sum_{\substack{l=1\\l\neq k}}^{K-1}\gamma_{ml}Z_{iqnm}\left(P_{ij}+WTP_k\right)+\sum_{m=4}^{6}\gamma_{mk}Z_{iqnm}\left(P_{ij}+WTP_k\right)$$

$$=\alpha_q P_{ij}+\sum_{\substack{l=1\\l\neq k}}^{K-1}\beta_l S_{iql}+\beta_k S^1_{iqk}+\sum_{n=1}^{N}\phi_n X_{iqn}+\sum_{m=1}^{3}\sum_{\substack{l=1\\l\neq k}}^{K-1}\gamma_{ml}S_{iql}Z_{iqnm}+\sum_{m=1}^{3}\gamma_{mk}S^1_{iqk}Z_{iqnm}+\sum_{m=4}^{6}\sum_{\substack{l=1\\l\neq k}}^{K-1}\gamma_{ml}Z_{iqnm}P_{ij}$$

$$+\sum_{m=4}^{6}\gamma_{mk}Z_{iqnm}P_{ij}. \qquad (4.1.1.15)$$

Here, S^2_{iqk} means that the *k*th attribute is improved and preferred by individual *i*, compared with S^1_{iqk}. Therefore, an individual's WTP for the *k*th attribute can be calculated as:

$$WTP^k=-\left[\frac{\beta_k\left(S^2_{iqk}-S^1_{iqk}\right)+\sum_{m=1}^{3}\gamma_{mk}Z_{iqnm}\left(S^2_{iqk}-S^1_{iqk}\right)}{\alpha_q+\sum_{m=4}^{6}\gamma_{mk}Z_{iqnm}}\right]. \qquad (4.1.1.16)$$

Delta method is then used to calculate the standard errors of the WTP estimates.

The negative sign for α_q is expected according to the law of demand. The parameter β_k could be positive or negative, depending on attribute S_{iqk}'s consumer perception. When consumer prefers the *k* attribute, we would observe a positive β_k. This would give us a positive WTP, which means subjects are willing to pay a price premium for products with attribute *k*.

Now, the probability function can be derived in terms of the indirect utility function. The equation (4.1.1.10) is rewritten by substituting equation (4.1.1.11) for the indirect utility:

$$\Pr^*_{iq}=\frac{\exp(V_{iq})}{\sum_{j=1}^{J}\exp(V_{ij})}=\frac{e^{\alpha_q P_{iq}+\sum_{k=1}^{K}\beta_k S_{iqk}+\sum_{n=1}^{N}\phi_n X_{iqn}}}{\sum_{j=1}^{J}e^{\alpha_j P_{ij}+\sum_{k=1}^{K}\beta_k S_{ijk}+\sum_{n=1}^{N}\phi_n X_{ijk}}}=\frac{(e^{\alpha_q P_{iq}+\sum_{k=1}^{K}\beta_k S_{iqk}})e^{\sum_{n=1}^{N}\phi_n X_{iqn}}}{(\sum_{j=1}^{J}e^{\alpha_j P_{ij}+\sum_{k=1}^{K}\beta_k S_{ijk}})e^{\sum_{n=1}^{N}\phi_n X_{ijn}}}$$

$$= \frac{e^{\alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk}}}{\sum_{j=1}^{J} e^{\alpha_j P_{ij} + \sum_{k=1}^{K} \beta_k S_{ijk}}} = \frac{\exp(V^*_{iq})}{\sum_{j=1}^{J} \exp(V^*_{ij})}. \quad (4.1.1.17)$$

Thus, $U^*_{iq} = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \varepsilon_{iq}$. (4.1.1.18)

The equation (4.1.1.18) then can be estimated by the maximum likelihood method, and the parameters obtained can be used to estimate the WTP for the basic model, where influences from survey versions and individuals' characteristics are not taken into consideration. Similar to equation (4.1.1.18), the equations that can be used to examine WTPs with information and characteristics effects are shown as following:

$$U^{**}_{iq} = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{k=1}^{K} \gamma_{1k} S_{iqk} Ver_{iq} + \sum_{k=1}^{K} \gamma_{4k} P_{iq} Ver_{iq} + \varepsilon_{iq}. \quad (4.1.1.19)$$

In addition, if the purpose is to investigate the WTPs with both information and characteristics effects, the equation can be expanded as following:

$$U^{***}_{iq} = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{m=1}^{3} \sum_{k=1}^{K} \gamma_{mk} S_{iqk} Z_{iqnm} + \sum_{m=4}^{6} \sum_{k=1}^{K} \gamma_{mk} P_{iq} Z_{iqnm} + \varepsilon_{iq}. \quad (4.1.1.20)$$

4.1.2 Empirical Specification

To estimate the probabilities of the chosen alternatives as functions of the alternatives' attributes, a basic conditional logit model was used. The descriptions of attributes that were estimated in the basic conditional logit models using the mail survey or the on-line survey data are presented in Table 4.1. There were five attributes included in each basic conditional logit

model. The estimated equations for the mailing and on-line survey, respectively, are represented in the as following equations:

$$V_{iq} = \alpha \Pr ice + \beta_{SA} US\_AU + \beta_{OR} ORG + \beta_{EN} ENV + \beta_{AN} ANIM \quad (4.1.2.1)$$

$$V_{iq} = \alpha \Pr ice + \beta_{SA} US\_AU + \beta_{OR} ORG + \beta_{EN} ENV + \beta_{AP} ANIM\_PRED . \quad (4.1.2.2)$$

Table 4.1 Descriptions of Attribute Variables

Attributes	
Price	Price of a pair of wool gloves
US	Binary variable: 1 represents that the wool gloves were made by U.S. grown wool, and 0 otherwise.
AU	Binary variable: 1 represents that the wool gloves were made by Australian grown wool, and 0 otherwise.
US_AU	The difference between two attributes: US and AU, where 1 represents US, and -1 represents AU.
ORG	Binary variable: 1 represents that the wool gloves were made by organically grown wool, and 0 otherwise.
ENV	Binary variable: 1 represents that the wool gloves were made by wool that was produced and processed using methods with minimum impact on the environment, and 0 otherwise.
ANIM	Binary variable: 1 represents that the wool gloves were made by wool that shorn with respect of animal welfare, and 0 otherwise.
PRED	Binary variable: 1 represents that the wool gloves were made by wool that comes from sheep raised by producers who do not kill native predators on their land, and 0 otherwise.
ANIM_PRED	The difference between two attributes: ANIM and PRED, where 1 represents pro-animal, and -1 represents predator-friendly.

In order to investigate the changes in WTP values when information and/or definition are provided, the dummy variables *V21* and *V* were included in the models for the mail survey and the on-line survey, respectively. The variable *V21* had a value of minus one, one and zero, which represented survey version A, B and C. Variable *V* only had two values, one and zero, which represented survey version C and A, respectively. The two utility functions that were used to estimate WTP with information effects are described as following:

Mail survey:

$$V_{iq} = \alpha Price + \beta_{SA} US\_AU + \beta_{OR} ORG + \beta_{EN} ENV + \beta_{AN} ANIM + \gamma_{p\times v} Price \times V21 + \gamma_{SA\times V} US\_AU \times V21 + \gamma_{OR\times V} ORG \times V21 + \gamma_{EN\times V} ENV \times V21 + \gamma_{AN\times V} ANIM \times V21 \quad (4.1.2.3)$$

On-line survey:

$$V_{iq} = \alpha Price + \beta_{SA} US\_AU + \beta_{OR} ORG + \beta_{EN} ENV + \beta_{AP} ANIM\_PRED + \gamma_{p\times v} Price \times V + \gamma_{SA\times V} US\_AU \times V + \gamma_{OR\times V} ORG \times V + \gamma_{EN\times V} ENV \times V + \gamma_{AP\times V} ANIM\_PRED \times V . \quad (4.1.2.4)$$

Utility functions were then expanded in order to examine the relationship between consumers' preferences and their characteristics. From the survey responses, demographic and psychographic characteristic variables were created as defined in Table 4.2 and Table 4.3, respectively. For the population density variable (*POPDENS*), the zip codes collected from the survey were referenced to look up the population density from the U.S. Census of Bureau's 3-digit / 5-digit zip code tabulation. The variable measuring knowledge of environmental impacts (*ENVK*) was created for the on-line sample by counting how many times the respondent selected the "Don't Know" option for the question on the extent of environmental damage the respondent thought was caused by growing cotton, raising sheep, manufacturing polyester, manufacturing rayon fiber, dyeing cotton and dyeing polyester.

Among the variables, the subsequent analysis focused on gender (*FEMALE*), age (*AGE*), education (*EDUC*), history of allergies (*ALLERGY*), ownership of pets (*PET*), income

(*INCOME*), and the region (*NEAST*, *SOUTH*, and *WEST*) and the population density (*POPDENS*) of residence for demographic characteristics, and belief in animal rights (*ANIMR*), knowledge of environmental impacts (*ENVK*), support for local business (*LOCALBIZ*), likelihood of trying a new restaurant (*NEWREST*), and familiarity of organic food (*FORGFOOD*) and organic wool (*FORGWOOL*) for psychographic variables. The final selection of these variables was chosen based on the likelihood ratio tests from several different combinations of variables. For each of the selected demographic and psychographic variables, the following equation illustrates how the interaction terms were included into the model:

Mail survey:

$$\begin{aligned} V_{iq} &= \alpha Price + \beta_{SA} US\_AU + \beta_{OR} ORG + \beta_{EN} ENV + \beta_{AN} ANIM + \gamma_{p\times v} Price \times V21 \\ &+ \gamma_{SA\times V} US\_AU \times V21 + \gamma_{OR\times V} ORG \times V21 + \gamma_{EN\times V} ENV \times V21 + \gamma_{AN\times V} ANIM \times V21 \\ &+ \gamma_{p\times G} \text{Price} \times Gender + \gamma_{SA\times G} US\_AU \times GENDER + \gamma_{OR\times G} ORG \times GENDER + \gamma_{EN\times G} ENV \times GENDER \\ &+ \gamma_{AN\times G} ANIM \times Gender + \gamma_{P\times V\times G} \text{Price} \times V21 \times GENDER + \gamma_{SA\times V\times G} US\_AU \times V21 \times GENDER \\ &+ \gamma_{OR\times V\times G} ORG \times V21 \times GENDER + \gamma_{EN\times V\times G} ENV \times V21 \times GENDER \\ &+ \gamma_{AN\times V\times G} ANIM \times V21 \times GENDER . \end{aligned} \quad (4.1.2.5)$$

On-line survey:

$$\begin{aligned} V_{iq} &= \alpha Price + \beta_{SA} US\_AU + \beta_{OR} ORG + \beta_{EN} ENV + \beta_{AP} ANIM\_PRED + \gamma_{p\times v} Price \times V \\ &+ \gamma_{SA\times V} US\_AU \times V + \gamma_{OR\times V} ORG \times V + \gamma_{EN\times V} ENV \times V + \gamma_{AP\times V} ANIM\_PRED \times V \\ &+ \gamma_{p\times G} \text{Price} \times Gender + \gamma_{SA\times G} US\_AU \times GENDER + \gamma_{OR\times G} ORG \times GENDER + \gamma_{EN\times G} ENV \times GENDER \\ &+ \gamma_{AP\times G} ANIM\_PRED \times Gender + \gamma_{P\times V\times G} \text{Price} \times V \times GENDER + \gamma_{SA\times V\times G} US\_AU \times V \times GENDER \\ &+ \gamma_{OR\times V\times G} ORG \times V \times GENDER + \gamma_{EN\times V\times G} ENV \times V \times GENDER \\ &+ \gamma_{AP\times V\times G} ANIM\_PRED \times V \times GENDER . \end{aligned} \quad (4.1.2.6)$$

SAS version 9.1 was used to estimate the parameters, and LIMDEP version 3.0 was used to compute WTPs and the standard errors.

Table 4.2 Definitions of Demographic

Variables	Name	Description
Gender	FEMALE	Binary variable: 1 represents that the individual is a female and 0 otherwise.
Age	AGE	Ordinal scaled variable: 1=under 25, 2=25-44, 3=45-59, 4=60-84, 5=85 and older.
Education	EDUC	Ordinal scaled variable: 1=Elementary school, 2=High school or equivalent, 3=Two-year college, 4=Four-year college, 5=Graduate school.
Allergies	ALLERGY	Binary variable: 1 represents that the individual has allergies and 0 otherwise.
Pets	PET	Binary variable: 1 represents that the individual has pets and 0 otherwise.
Household income	INCOME	Ordinal scaled variable: 1=<$14,999, 2=$15,000-$24,999, 3=$25,000-$34,999, 4=$35,000-$74,999, 5=$75,000-$99,999, 6=$100,000-$149,999, 7=>$150,000.
Population density	POPDENS	Continuous variable: population in zip code area raised to the power of one fourth.
Northeast	NEAST	Binary variable: 1 represents that the individual lives in the Northeast based on US Census regional divisions, and 0 otherwise.
South	SOUTH	Binary variable: 1 represents that the individual lives in the South based on US Census regional divisions and 0 otherwise.
West	WEST	Binary variable: 1 represents that the individual lives in the West based on US Census regional divisions and 0 otherwise.
Race	RACE	Ordinal scaled variable: 1=White, 2=Black/ African American, 3=Hispanic, 4=American Indian/Alaska Native, 5=Asian, 6=Native Hawaiian/ Pacific Islander, 7=Other.

Table 4.2 Definitions of Demographic Variables (Continued)

Variables	Name	Description
Marital	MARRIED	Binary variable: 1 represents that the individual is married and 0 otherwise.
Kids under 3 years old	KIDSU3	Binary variable: 1 represents that the individual has at least one child under 3 years old in the household and o otherwise.

Table 4.3 Definitions of Psychographic and Behavioral Variables

Variables	Name	Description
Animal right	ANIMR	Scaled variable to measure subject's belief in animal rights that animals are capable of suffering and have an interest in leading their own lives: 1=Not at all, 2=Slightly, 3=Partly, 4=Mostly, 5=Definitely, 6=Don't know.
Knowledge of environmental impacts	ENVK	Ordinal scaled variable, which measures number of times subject did not know the environmental impact of fiber production items: 0=No times, 1=Once, 2=Twice, 3=Three times, 4=Four times, 5=Five times, 6=Six times.
Local business support	LOCALBIZ	Ordinal scaled variable, which measures how often subject shops or eats at local, independent business, compared to nationally and regionally franchised business: 1=Never, 2=<15%, 3=15-50%, 4=50-85%, 5=>85%.
New restaurant	NEWREST	Ordinal scaled variable, which measures how likely the subject would try a new restaurant within a week of its opening in their neighborhood: 1=<10%, 2=10-40%, 3=40-60%, 4=60-90%, 5=>90%.
Familiarity with organic food	FORGFOOD	Scaled variable to measure subject's familiarity with organic food product: 1=Never heard about it, 2=Heard about it, but don't know what it is, 3=Moderately familiar with its attributes, 4=Very familiar with its attributes.
Familiarity with organic wool	FORGWOOL	Scaled variable to measure subject's familiarity with organic wool product: 1=Never heard about it, 2=Heard about it, but don't know what it is, 3=Moderately familiar with its attributes, 4=Very familiar with its attributes.
Familiarity with organic cotton	FORGCOTT	Scaled variable to measure subject's familiarity with organic cotton product: 1=Never heard about it, 2=Heard about it, but don't know what it is, 3=Moderately familiar with its attributes, 4=Very familiar with its attributes.

Table 4.3 Definitions of Psychographic and Behavioral Variables (Continued)

Variables	Name	Description
Recycling	RECYLE	Ordinal scaled variable, which measures frequency of recycling: 1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always.
U.S. products	USPROD	Ordinal scaled variable, which measures how frequently a subject chooses the US-grown food product over other the same food products from other countries: 1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always.
Purchase organic fruits	PFRU	Ordinal scaled variable, which measures frequency of purchasing organic fruits: 1=Never, 2=<10% of the time, 3=10-39%, 4=40-59%, 5=60-89%, 6=>90% of the time.
Purchase organic vegetables	PVEG	Ordinal scaled variable, which measures frequency of purchasing organic vegetables: 1=Never, 2=<10% of the time, 3=10-39%, 4=40-59%, 5=60-89%, 6=>90% of the time.
Purchase organic meat	PMEAT	Ordinal scaled variable, which measures frequency of purchasing organic meat: 1=Never, 2=<10% of the time, 3=10-39%, 4=40-59%, 5=60-89%, 6=>90% of the time.
Purchase organic dairy products	PDAIRY	Ordinal scaled variable, which measures frequency of purchasing organic dairy products: 1=Never, 2=<10% of the time, 3=10-39%, 4=40-59%, 5=60-89%, 6=>90% of the time.
Purchase organic apparel	PAPP	Ordinal scaled variable, which measures frequency of purchasing organic apparel: 1=Never, 2=<10% of the time, 3=10-39%, 4=40-59%, 5=60-89%, 6=>90% of the time.
Purchase organic bath & bedding	PBATH	Ordinal scaled variable, which measures frequency of purchasing organic bath & bedding: 1=Never, 2=<10% of the time, 3=10-39%, 4=40-59%, 5=60-89%, 6=>90% of the time.
Purchase organic skin care products	PSKIN	Ordinal scaled variable, which measures frequency of purchasing organic skin care products: 1=Never, 2=<10% of the time, 3=10-39%, 4=40-59%, 5=60-89%, 6=>90% of the time.

Table 4.3 Definitions of Psychographic and Behavioral Variables (Continued)

Variables	Name	Description
Environmental impact of growing cotton	ECOTTON	Ordinal scaled variable, which measures how much a subject aware of environmental damage of growing cotton: 1=No damage, 2=Slight damage, 3=Moderate damage, 4=Much damage.
Environmental impact of manufacturing polyester	EPOLY	Ordinal scaled variable, which measures how much a subject aware of environmental damage of manufacturing polyester: 1=No damage, 2=Slight damage, 3=Moderate damage, 4=Much damage.
Environmental impact of manufacturing rayon fiber	ERAYON	Ordinal scaled variable, which measures how much a subject aware of environmental damage of manufacturing rayon fiber: 1=No damage, 2=Slight damage, 3=Moderate damage, 4=Much damage.
Environmental impact of dyeing cotton fabric	EDYECOTT	Ordinal scaled variable, which measures how much a subject aware of environmental damage of dyeing cotton fabric: 1=No damage, 2=Slight damage, 3=Moderate damage, 4=Much damage.
Environmental impact of dyeing polyester fabric	EDYEPOLY	Ordinal scaled variable, which measures how much a subject aware of environmental damage of dyeing polyester fabric: 1=No damage, 2=Slight damage, 3=Moderate damage, 4=Much damage.

4.2 Determining Factors of Consumer Segments

4.2.1 Econometric Model

The survey responses are analyzed using a multinomial logit model. Similar to individuals make discrete choice from a set of *J + 1* alternatives, the utility of the *i*th subject belonging to segment *j* is shown as following:

$$U_{ij} = \sum_{n=1}^{N} \beta_j X_{in} + \varepsilon_{ij}, J = 0,..., J. \quad (4.2.1.1)$$

$$V_{ij} = \sum_{n=1}^{N} \beta_j X_{in}, j = 0,..., J. \quad (4.2.1.2)$$

In the equations above, X_{in} represents the *i*th consumer's *n*th characteristics, β_j represents the parameters associated with segment *j*, and ε_{ij} represents the associated error term. The subject belongs to segment *j* instead of segment *k* when U_{ij} is greater than U_{ik}, for $k \neq j$.

According to a multinomial logit model (Nerlove and Press, 1973), the error terms are independent across segments and are identically distributed with Gumbel distribution:

$$F(\varepsilon_{ij}) = \exp(-e^{-\varepsilon_{ij}}). \quad (4.2.1.3)$$

Therefore, the probability of a subject with *N* characteristics is belonging to the *j*th segment can be described as:

$$\Pr(Y_i = j) = \frac{\exp(V_{ij})}{\sum_{k=0}^{J} \exp(V_{ik})} = \frac{e^{\sum_{n=1}^{N} \beta_j X_{in}}}{\sum_{k=0}^{J} e^{\sum_{n=1}^{N} \beta_k X_{in}}}, j = 0,..., J. \quad (4.2.1.4)$$

In the equation (4.2.1.4), Y_i is a random variable, which implies the consumer segment that the *i*th subject belongs to. Since the probabilities need to sum to one, it is convenient to normalize the variables associated with the first segment to zero (Green, 2003).

Marginal effects of the characteristics on the probabilities with everything else remaining constant can be derived from the estimated coefficients. The probabilities (4.2.1.4) are differentiated with respect to the *i*th individual's characteristics (X_i):

$$\frac{\partial \Pr(Y_i = j)}{\partial X_i} = \frac{e^{\beta_j' X_i}}{\sum_{k=0}^{J} e^{\beta_k' X_i}} \left(\beta_j - \sum_{l=0}^{J} \frac{e^{\beta_l' X_i} \beta_l}{\sum_{k=0}^{J} e^{\beta_k' X_i}} \right). \quad (4.2.1.5)$$

Since total probabilities should equal to one, the marginal effects of the probabilities with respect to a change in a certain variable sum to zero. In addition, the marginal effects are calculated at the sample mean. In order to obtain marginal effects of single dummy variables (e.g. gender), the differences between the estimated probabilities at its boundaries (zero and one) are computed:

$$\Pr(Y_i = j \mid X_{ij} = 1) - \Pr(Y_i = j \mid X_{ij} = 0) \quad (4.2.1.6)$$

For grouped dummy variables (e.g. educational levels), the marginal effects of each variable are calculated by respective value, holding the rest of variables in the same group at zero. Delta method is applied to obtain standard errors for marginal effects.

4.2.2 Defining Consumer Segments

In order to study consumers' criteria when making purchasing decisions, subjects were categorized by the attributes that they selected most frequently in the six choice sets. The mail

survey had the following seven attributes: U.S., Australian, organic, pro-environment, pro-animal, cheapest wool, and acrylic. In addition to the above seven attributes, the on-line survey had one additional attribute: predator-friendly. The frequency the participants chose an attributes was counted by analyzing the participants' choices. The number should be an integer between zero and six. Several respondents failed to choose one attribute more than three times and were excluded. As a result, the sample size dropped from 514 to 507 for the on-line survey and 595 to 581 for the mail survey. If a participant chose an attribute more than four times and a higher frequency than other attributes, then that particular participant was grouped into the category corresponding to that certain attribute. In the case where an attribute was chosen at an equal frequency as the price attribute and both were chosen more than four times, and then the participant was grouped with the attribute other than price. The rest of subjects, who gave the same weight to two or more attributes, were allocated into two categories: (1) Concerns for Animal Welfare, and (2) Concerns for Country of Origin and Environment. Participants in the first category selected one of the two attributes that were related to animal welfare (pro-animal and predator-friendly), which implied that these participants considered animal welfare more important than other attributes such as environmental concerns, country-of-origin, and price. The subjects who belonged to the second category viewed country of origin and environment as important attributes, but not as important as animal welfare. Therefore, there were ten categories created from the data.

In order to have an efficient model, the ten categories were aggregated into five categories. A table that explained how these categories were aggregated is as follows:

Table 4.4 Aggregating Consumer Segments

Ten Categories	Five Categories
US Australia	Country-of-Origin
Organic Pro-Environment Concerns for COOL & environment	Pro-Environmet
Pro-Animal Predator-friendly Concerns for animal welfare	Pro-Animal
Acrylic	Acrylic
Cheapest wool	Cheapest wool

4.2.3 Empirical Specification

The following five consumers segments were considered for both the mail survey and the on-line survey samples: COO-focused, Animal-focused, Environment-focused, Acrylic, and Cheapest Wool. In addition to commonly investigated demographic characteristics of gender, age, education, household income, and region of residence, population density was included to examine the effect of urbanicity in which segments individuals belonged. Further, history of allergy and ownership of pets were included because of their seeming relevance to preferences towards natural or synthetic fibers and attitudes toward animal welfare.

In addition, several psychographic characteristics variables were included in the model to further examine consumers' characteristics in each group. Subjects who believed in animal right were expected to be more likely categorized into the Animal-focused group. The subjects aware of the environmental impacts were expected to be more likely Environment-focused. Similarly,

people who supported local businesses may have a higher tendency of purchasing based on COO information, and people who are more familiar with organic products were expected to be more concerned with the environment. Furthermore, the likelihood of trying a new restaurant was believed to proxy a more risk-taking behavior, arguably consistent with progressive attitudes of being Animal-focused or Environment-focused. Therefore, psychographic characteristics consisting of belief in animal right, knowledge of the environmental impacts caused by fabric production, the support of local businesses, the likelihood of trying a new restaurant in town, and familiarities with organic foods and wool were included in the model.

LIMDEP version 3.0 was used to estimate the multinomial model to predict consumer segments, compute the marginal effects, and calculate standard errors.

CHAPTER 5 - Results

5.1 Testing the Differences between Two Samples

Since the survey was sent to participants through two systems: postal mail and emails with the survey link, it is necessary to determine if the survey's responses can be pooled together to obtain a cohesive set of results, or if the two samples should be examined separately. The likelihood ratio test was applied to inspect if the samples of mail and on-line surveys were significantly different from each other. The results (Table 5.1) showed that estimated constant terms and coefficients of the mail and on-line surveys were different from each other at the five percent level. Therefore, it is necessary to investigate these two types of survey separately. In addition, the one-way analysis of variance was utilized to discover which variables were significantly different from each other in these two survey samples. The definitions of the thirteen demographic variables and twenty-one psychographic variables are reported in Table 4.2and Table 4.3.

Table 5.1 Likelihood Ratio Test: Differences between Mail and On-line Survey

	Log likelihood function values	Number of observations	Number of coefficients
Mail survey	-778.7727	581	18
On-line survey	-693.8009	504	18
Mail survey + On-line survey	-1588.701	1085	18
Log likelihood ratio			232.26
Critical Chi-squared value (p=0.05, df=18)			28.87

In the Table 5.2, all of the demographic variables except for the marital variable were significantly different from each other at the one percent level. The marital variable was significant at the five percentage level. These two survey samples also were significantly different at the one percent level in terms of familiarity of organic food, knowledge of environmental damages from producing and processing fiber, belief in animal rights, frequency of recycling, preference for U.S grown products, willingness of supporting local business, and likelihood of trying new restaurants within one week of its opening. Also, the frequency of purchasing organic fruits, vegetables, dairy products, and familiarity of organic cotton were found to be significantly different from each other in these two survey samples. Again, these consequences revealed that it is necessary to analyze consumers' preferences in terms of demographic and psychographic factors individually for the mail and on-line surveys.

Table 5.2 One-way Analysis of Variance for Effects of the Mail and On-line Survey Samples on Demographic and Psychographic Variables

Variables	df	SS	MS	F
Region				
Between groups	1	9.0848	9.0848	8.7215***
Within groups	1083	1128.1133	1.0417	
Gender				
Between groups	1	12.8024	12.8024	55.6107***
Within groups	1083	249.3229	0.2302	
Marital				
Between groups	1	5.0038	5.0038	3.9303**
Within groups	1083	1378.8082	1.2731	
Age				
Between groups	1	190.3880	190.3880	232.9411***
Within groups	1083	885.1604	0.8173	
Race				
Between groups	1	0.7149	0.7149	0.4317
Within groups	1083	1793.3164	1.6559	
Kids under 3				
Between groups	1	2.2896	2.2896	19.4182***
Within groups	1083	127.6957	0.1179	
Education				
Between groups	1	132.1311	132.1311	118.6299***
Within groups	1083	1206.2560	1.1138	
Allergy				
Between groups	1	3.8111	3.8111	15.7423***
Within groups	1083	262.1852	0.2421	
Pet				
Between groups	1	1.6856	1.6856	7.8389***
Within groups	1083	232.8821	0.2150	
Income				
Between groups	1	587.1623	587.1623	266.4558***
Within groups	1083	2386.5004	2.2036	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.2 One-way Analysis of Variance for Effects of the Mail and On-line Survey Samples on Demographic and Psychographic Variables (continued)

Variables	df	SS	MS	F	
Purchase Organic Fruit					
Between groups	1	10.6708	10.6708	5.6075	**
Within groups	1083	2060.8997	1.9030		
Purchase Organic Vegetable					
Between groups	1	9.2752	9.2752	4.7786	**
Within groups	1083	2102.0889	1.9410		
Purchase Organic Meat					
Between groups	1	0.4777	0.4777	0.2644	
Within groups	1083	1957.1444	1.8072		
Purchase Organic Dairy Products					
Between groups	1	8.0954	8.0954	3.6695	*
Within groups	1083	2389.2042	2.2061		
Purchase Organic Apparel					
Between groups	1	0.0059	0.0059	0.0047	
Within groups	1083	1344.7222	1.2417		
Purchase Organic Bath and Bedding		0.0271	0.0271	0.0208	
Between groups	1	1410.9923	1.3029		
Within groups	1083				
Purchase Organic Skin Care Products		2.3905	2.3905	1.2145	
Between groups	1	2131.7238	1.9684		
Within groups	1083				
Familiarity with Organic Food		67.0973	67.0973	125.2663	***
Between groups	1	580.0953	0.5356		
Within groups	1083				
Familiarity with Organic Cotton					
Between groups	1	3.2252	3.2252	3.4263	*
Within groups	1083	1019.4513	0.9413		
Familiarity with Organic Wool					
Between groups	1	2.3905	2.3905	2.4112	
Within groups	1083	1073.7238	0.9914		

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.2 One-way Analysis of Variance for Effects of the Mail and On-line Survey Samples on Demographic and Psychographic Variables (continued)

Variables	df	SS	MS	F	
Environmental Impact of Growing Cotton					
Between groups	1	365.8832	365.8832	200.7596	***
Within groups	1083	1973.7611	1.8225		
Environmental Impact of Manufacturing Polyester					
Between groups	1	330.9429	330.9429	213.9714	***
Within groups	1083	1675.0424	1.5467		
Environmental Impact of Manufacturing Rayon Fiber					
Between groups	1	380.6934	380.6934	257.3110	***
Within groups	1083	1602.3057	1.4795		
Environmental Impact of Dyeing Cotton Fabric					
Between groups	1	417.8154	417.8154	273.2808	***
Within groups	1083	1655.7846	1.5289		
Environmental Impact of Dyeing Polyester Fabric					
Between groups	1	336.8415	336.8415	216.1732	***
Within groups	1083	1687.5327	1.5582		
Animal Right					
Between groups	1	21.5474	21.5474	10.5033	***
Within groups	1083	2221.7522	2.0515		
Recycle					
Between groups	1	32.9606	32.9606	27.0460	***
Within groups	1083	1319.8376	1.2187		
Prefer U.S. Products than Other Country of Origin					
Between groups	1	13.4627	13.4627	14.3598	***
Within groups	1083	1015.3428	0.9375		
Frequency of Shop or Eat at Local					
Between groups	1	17.0911	17.0911	17.3554	***
Within groups	1083	1066.5071	0.9848		
Likelihood of Trying New Restaurant					
Between groups	1	42.0239	42.0239	35.6494	***
Within groups	1083	1276.6526	1.1788		

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

5.2 Results of WTP Estimations

Since the experiment design had been changed in the on-line survey, the models used to estimate WTPs for various attributes for the mail and on-line surveys were slightly different.

5.2.1 Results from the Mail Survey

Before estimating the WTPs for wool products' attributes, a one-way analysis of variance was used to discover if the individuals differed significantly in both demographic and psychographic nature (Table 4.2 and Table 4.3) between different versions of survey. The differences between the three survey versions were described in full in the data section. There were no significant differences observed between most of the variables (Table 5.3). All demographic characteristics were found to have insignificant differences in their means between the three versions of survey. The means of the psychographic characteristics from each survey version were only significantly different for the following variables: frequency of purchasing organic fruits, vegetables, apparel, and skin care products. Therefore, this research combined the responses from all versions as a single sample to estimate the consumers' preferences in terms of their demographic and psychographic nature.

Table 5.3 One-way Analysis of Variance for Effects of the Mail Survey Version on Demographic and Psychographic Variables

Variables	df	SS	MS	F
Region				
Between groups	2	1.1007	0.5504	0.5231
Within groups	592	622.8388	1.0521	
Gender				
Between groups	2	0.2683	0.1342	0.5351
Within groups	592	148.4308	0.2507	
Marital				
Between groups	2	1.2891	0.6446	0.6152
Within groups	592	620.2503	1.0477	
Age				
Between groups	2	1.4538	0.7269	1.0394
Within groups	592	414.0017	0.6993	
Race				
Between groups	2	0.0186	0.0093	0.0053
Within groups	592	1038.9561	1.7550	
Kids under 3				
Between groups	2	0.2344	0.1172	1.3113
Within groups	592	52.9152	0.0894	
Education				
Between groups	2	3.7902	1.8951	1.5744
Within groups	592	712.6064	1.2037	
Allergy				
Between groups	2	0.0656	0.0328	0.1394
Within groups	592	139.3562	0.2354	
Pet				
Between groups	2	1.1604	0.5802	2.5440
Within groups	592	135.0144	0.2281	
Income				
Between groups	2	7.2724	3.6362	1.6749
Within groups	592	1285.2386	2.1710	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.3 One-way Analysis of Variance for Effects of the Mail Survey Version on Demographic and Psychographic Variables (continued)

Variables	df	SS	MS	F
Purchase Organic Fruits				
Between groups	2	12.3914	6.1957	3.2949 *
Within groups	592	1113.1784	1.8804	
Purchase Organic Vegetables				
Between groups	2	14.6475	7.3237	3.8435 *
Within groups	592	1128.0517	1.9055	
Purchase Organic Meat				
Between groups	2	9.3196	4.6598	2.6985
Within groups	592	1022.2502	1.7268	
Purchase Organic Dairy Products				
Between groups	2	11.4187	5.7093	2.4671
Within groups	592	1370.0166	2.3142	
Purchase Organic Apparel				
Between groups	2	7.2924	3.6462	3.3842 *
Within groups	592	637.8236	1.0774	
Purchase Organic Bath and Bedding			3.3214	2.7417
Between groups	2	6.6428	1.2115	
Within groups	592	717.1790		
Purchase Organic Skin Care Products			502.0000	4.3342 *
Between groups	2	17.6245	2.0332	
Within groups	592	1203.6461		
Familiarity with Organic Food			0.0716	0.1698
Between groups	2	0.1431	0.4214	
Within groups	592	249.4435		
Familiarity with Organic Cotton				
Between groups	2	1.0864	0.5432	0.5487
Within groups	592	586.1136	0.9901	
Familiarity with Organic Wool				
Between groups	2	0.7077	0.3539	0.3224
Within groups	592	649.7360	1.0975	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.3 One-way Analysis of Variance for Effects of the Mail Survey Version on Demographic and Psychographic Variables (continued)

Variables	df	SS	MS	F
Environmental Impact of Growing Cotton				
Between groups	2	3.8693	1.9346	2.2621
Within groups	592	506.3055	0.8552	
Environmental Impact of Manufacturing Polyester				
Between groups	2	0.7521	0.3761	0.3009
Within groups	592	739.8126	1.2497	
Environmental Impact of Manufacturing Rayon Fiber				
Between groups	2	0.4292	0.2146	0.1813
Within groups	592	700.8582	1.1839	
Environmental Impact of Dyeing Cotton Fabric				
Between groups	2	0.0350	0.0175	0.0166
Within groups	592	623.5616	1.0533	
Environmental Impact of Dyeing Polyester Fabric				
Between groups	2	0.2374	0.1187	0.0959
Within groups	592	732.5122	1.2374	
Animal Right				
Between groups	2	0.7867	0.3933	0.1836
Within groups	592	1268.5982	2.1429	
Recycle				
Between groups	2	0.2978	0.1489	0.1409
Within groups	592	625.6417	1.0568	
U.S. Products				
Between groups	2	2.1290	1.0645	1.3097
Within groups	592	481.1819	0.8128	
Local Business Support				
Between groups	2	3.1565	1.5783	1.7806
Within groups	592	524.7259	0.8864	
New Restaurant				
Between groups	2	1.3059	0.6529	0.7016
Within groups	592	550.9227	0.9306	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

The mail data were than used to examine demographic and psychographic characteristics influences on consumers' purchasing behavior were re-organized to estimate U.S. consumers' WTPs for attributes of the wool gloves using conditional logit model. The four estimated attributes were: US_AU, ORG, ENV, and ANIM, and the descriptions are presented in Table 4.1. Results from the basic conditional logit model are reported in Table 5.4. All coefficients were statistically significant at the one percent level, which implies that consumers appreciated and valued all additional wool labels. As the measurement of goodness-of-fit, both log-likelihood ratio and McFadden's (1974) log-likelihood ratio index were presented. The log-likelihood ratio test indicated that the data fitted this model well. Although McFadden's R-square value is between zero and one, it lacks an intuitive interpretation regarding the overall performance of this model (Greene, 2003).

Table 5.4 Estimated Results of the Basic Conditional Logit Model, Mail Survey

Variables	Coefficient	WTP
Price	-0.992 ***	
	(0.041)	
US_AU	0.522 ***	0.526 ***
	(0.022)	(0.027)
ORG	0.525 ***	0.529 ***
	(0.041)	(0.037)
ENV	1.190 ***	1.200 ***
	(0.051)	(0.041)
ANIM	0.910 ***	0.917 ***
	(0.040)	(0.042)
Number of observations		3816
Log-likelihood ratio		1614.1
McFadden's (1974) log-likelihood ratio index		0.1526

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

The results indicated that on average, consumers were willing to pay 53 cents more for a pair of US wool gloves than a pair of Australian wool gloves, holding all else equal. Despite the imported products being known for higher quality, the participants seem to favor domestic goods over the imported goods on average. One explanation for this favoritism may be the lack of knowledge that the participants regarding the quality of the goods.

Compared with acrylic, average respondents were willing to pay 53 cents, $1.20, and 92 cents more for a pair of wool gloves that were labeled as being organic, environment-friendly, and animal-friendly, respectively. These outcomes implied that at least a portion of U.S. consumers preferred wool over acrylic, which would be an encouragement to the U.S. wool industry. Although the organic industry has grown in recent years, the WTP estimations show

that the respondents were willing to pay a larger price premium for the environment-friendly and animal-friendly labeling than for the organic labeling. This finding could be attributed to low awareness of organic apparel products. The results also support the idea that organically grown may not be the only way to differentiate wool products from conventional wool products. Therefore, it may be beneficial to develop certification systems for the use of environment-friendly and animal-friendly labels, which have less restriction than organic certification. Such development will facilitate more farmers to label their products for price premium.

The variable V21 was included to investigate the influence of the additional information on the added values of the attributes such as country of origin, organic, environment-friendly and animal-friendly. This variable had a value of minus one, one and zero, representing survey versions A (the basic version), B (the basic version with definitions of attributes) and C (the version B with additional information), respectively. The estimation results are presented in Table 5.5.

Table 5.5 Estimated Results of the Conditional Logit Model with the Definitions and Information Effects, Mail Survey

Variables	Coefficient	Willingness-to-Pay		
		The Basic Version	With Definitions	With Additional Information
Price	-1.000 ***			
	(0.041)			
US_AU	0.522 ***	0.619 ***	0.453 ***	0.522 ***
	(0.022)	(0.055)	(0.035)	(0.027)
ORG	0.525 ***	0.581 ***	0.486 ***	0.525 ***
	(0.041)	(0.069)	(0.051)	(0.036)
ENV	1.191 ***	1.364 ***	1.067 ***	1.190 ***
	(0.051)	(0.080)	(0.055)	(0.040)
ANIM	0.918 ***	0.874 ***	0.950 ***	0.918 ***
	(0.040)	(0.077)	(0.060)	(0.042)
Price_V21	-0.169 ***			
	(0.051)			
US_AU_V21	0.008			
	(0.027)			
ORG_V21	0.057			
	(0.052)			
ENV_V21	0.043			
	(0.064)			
ANIM_V21	0.192 ***			
	(0.050)			
Number of observations				3816
Log-likelihood ratio				1637.7
McFadden's (1974) log-likelihood ratio index				0.1548

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Again, the log-likelihood ratio test revealed the model was statistically significant. The coefficients of attributes themselves were all statistically different from zero at the one percent level. In addition, the interactive parameters for price and animal-friendly were significant at the one percent level. The WTPs for all attributes in all three survey versions were significant at the one percent level. There were no dramatic differences between the WTP values among the different survey versions. The WTP for the environment-friendly attribute varied the most among the different survey versions. Consumers would pay 12 cents more for environment-friendly labeled products when the additional information was provided, compared to the survey that only provided definitions of the attributes. However, the participants would pay 17 cents more in the basic survey version than in the survey containing additional information. Similar results were found in regards to the COO and organic attributes, consumers valued these characteristics more in the basic survey than the other two survey versions. However, for the animal-friendly attribute, the subjects gave the highest price premium in the survey with definitions of the attributes provided, followed by the survey with information and then the basic version.

The results from the analysis of variance suggested that there were no statistically significant differences observed between the survey versions for all demographic variables such as gender, age, income, and education. Most of the psychographic variables did not differ among the versions. Therefore, the estimated coefficients, which had interactions between the versions, had likely little to do with the demographic and psychographic differences, but rather they were associated with the direct effects from the additional knowledge provided in the surveys.

The estimated WTPs from the model accounting for both the informational effect and demographic and psychographic differences are presented in Table 5.6 to Table 5.17. Table 5.6, Table 5.7, and Table 5.8 indicate the amount respondents were willing to pay for U.S. wool products, compared to Australian wool products. All WTPs were found to be positive and significant at least at the five percent level. The following patterns were found among the different versions: subjects of any gender, age group, education level, population density of living area, held any degree of belief in animal rights and environment impacts, were not willing to pay more for this attribute when more information was provided. A similar pattern was discovered among subjects who did or did not have allergies and pets, had higher income, or were more familiar with organic foods. These clusters of consumers paid more in the basic survey, followed by the surveys with information and with definitions. Additional information about the attributes did help increase the WTPs for consumers who had lower income, or were less familiar with organic foods. In this case, influences from definitions alone were higher than the combined influence from additional information and definitions. However, the differences between the WTP amounts were small. Thus, adding the additional information was not an effective method to increase respondents' average WTP for wool products with COO labeling.

Table 5.6 Willingness to Pay for U.S. Wool Gloves over Australian Wool Gloves, Mail Survey

Variables	Without Additional Information						
FEM	Female	Male					
	0.664 ***	0.586 ***					
	(0.087)	(0.070)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	0.510 ***	0.556 ***	0.610 ***	0.674 ***	0.753 ***		
	(0.110)	(0.076)	(0.054)	(0.094)	(0.188)		
EDUC	Elem.Sch	High Sch	2Yr College	4Yr College	Grad Sch.		
	1.305 **	0.885 ***	0.691 ***	0.579 ***	0.506 ***		
	(0.606)	(0.192)	(0.077)	(0.051)	(0.058)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.406 ***	0.459 ***	0.524 ***	0.607 ***	0.716 ***	0.864 ***	1.077 ***
	(0.059)	(0.054)	(0.050)	(0.054)	(0.076)	(0.131)	(0.245)
ALG	With	Without					
	0.628 ***	0.599 ***					
	(0.072)	(0.083)					
PET	With	Without					
	0.665 ***	0.549 ***					
	(0.077)	(0.077)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.713 ***	0.589 ***	0.505				
	(0.123)	(0.057)	(0.106)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.619 ***	0.620 ***	0.622 ***	0.623 ***	0.624 ***		
	(0.115)	(0.079)	(0.057)	(0.060)	(0.083)		
ENVK	Most	←					→ Least
	0.604 ***	0.580 ***	0.557 ***	0.535 ***	0.513 ***	0.492 **	0.472 **
	(0.060)	(0.084)	(0.115)	(0.147)	(0.177)	(0.206)	(0.233)
FORG	Least	Some	Moderate	High			
	0.385 ***	0.461 ***	0.567 ***	0.726 ***			
	(0.118)	(0.090)	(0.056)	(0.100)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.7 Willingness to Pay for U.S. Wool Gloves over Australian Wool Gloves, Mail Survey

Variables	With Additional Definitions						
FEM	Female	Male					
	0.568 ***	0.355 ***					
	(0.060)	(0.043)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	0.297 ***	0.361 ***	0.448 ***	0.574 ***	0.773 ***		
	(0.060)	(0.044)	(0.036)	(0.074)	(0.190)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	1.003 **	0.677 ***	0.529 ***	0.445 ***	0.390 ***		
	(0.436)	(0.143)	(0.058)	(0.035)	(0.040)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.556 ***	0.519 ***	0.489 ***	0.464 ***	0.444 ***	0.426 ***	0.411 ***
	(0.135)	(0.090)	(0.058)	(0.040)	(0.035)	(0.041)	(0.051)
ALG	With	Without					
	0.516 ***	0.355 ***					
	(0.049)	(0.051)					
PET	With	Without					
	0.426 ***	0.523 ***					
	(0.040)	(0.074)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.678 ***	0.396 ***	0.230 ***				
	(0.104)	(0.036)	(0.065)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.431 ***	0.439 ***	0.449 ***	0.460 ***	0.472 ***		
	(0.063)	(0.048)	(0.037)	(0.040)	(0.061)		
ENVK	Most ←						→ Least
	0.452 ***	0.451 ***	0.450 ***	0.448 ***	0.447 **	0.445 **	0.443
	(0.043)	(0.069)	(0.102)	(0.139)	(0.181)	(0.226)	(0.275)
FORG	Least	Some	Moderate	High			
	0.530 ***	0.495 ***	0.463 ***	0.435 ***			
	(0.169)	(0.094)	(0.042)	(0.047)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.8 Willingness to Pay for U.S. Wool Gloves over Australian Wool Gloves, Mail Survey

Variables	With Definitions and Additional Information						
FEM	Female	Male					
	0.609 ***	0.450 ***					
	(0.045)	(0.033)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	0.378 ***	0.438 ***	0.515 ***	0.618 ***	0.763 ***		
	(0.048)	(0.035)	(0.027)	(0.051)	(0.116)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	1.133 ***	0.767 ***	0.598 ***	0.502 ***	0.439 ***		
	(0.318)	(0.103)	(0.042)	(0.026)	(0.030)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.467 ***	0.487 ***	0.506 ***	0.526 ***	0.545 ***	0.565 ***	0.586 ***
	(0.055)	(0.044)	(0.034)	(0.029)	(0.030)	(0.040)	(0.053)
ALG	With	Without					
	0.562 ***	0.459 ***					
	(0.036)	(0.040)					
PET	With	Without					
	0.522 ***	0.534 ***					
	(0.034)	(0.046)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.693 ***	0.475 ***	0.340 ***				
	(0.070)	(0.027)	(0.049)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.498 ***	0.508 ***	0.518 ***	0.529 ***	0.541 ***		
	(0.049)	(0.036)	(0.028)	(0.030)	(0.044)		
ENVK	Most ←						→ Least
	0.516 ***	0.507 ***	0.498 ***	0.488 ***	0.478 ***	0.468 ***	0.457 ***
	(0.031)	(0.047)	(0.068)	(0.090)	(0.113)	(0.137)	(0.161)
FORG	Least	Some	Moderate	High			
	0.450 ***	0.478 ***	0.509 ***	0.543 ***			
	(0.088)	(0.058)	(0.030)	(0.040)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

The results in all three versions of survey also revealed that as subjects become younger, more educated, or resided in a denser populated area, the less they would be willing to pay for COO labeling. The degree to which one believed in animal rights did not have an impact on the WTP for this attribute. With regards to the basic version survey and the survey with additional information, when the subjects' income increased, the higher the price premium offered for COO-focused attribute. Conversely, in the survey with the definition, as subjects' income increased, the lower the price premium offered. The same trend was observed regarding consumers' familiarity of organic foods. Lastly, the knowledge of environmental impacts had a positive influence on increasing WTP for COO-focused characteristic in all versions of survey. However when more information was provided, the differences between WTPs for different levels of awareness of environmental damages caused by manufacturing or processing fabric decreased.

In Table 5.9, Table 5.10, and Table 5.11, the WTPs for organic wool gloves over acrylic gloves were presented. Again, most of the estimated WTPs were statistically different from zero. Consumers were willing to pay more for this attribute when no additional information was provided in the survey for the consumers who belonged to at least one of the following segments: younger, less conviction in animal rights, any education and income level, knowledgeable more about environmental impacts, and being familiar with organic foods. Unlike the previous results, female participants were more likely to increase their WTP premiums for organic wool gloves when more information was offered, even though the premium amounts were small. Additional knowledge had a similar influence on WTPs in individuals with pets at home and individuals with stronger belief of animal rights.

Table 5.9 Willingness to Pay for Organic Wool Gloves, Mail Survey

Variables	Without Additional Information						
FEM	Female	Male					
	0.460 ***	0.650 ***					
	(0.103)	(0.092)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.022 ***	0.835 ***	0.614 ***	0.351 ***	0.030		
	(0.188)	(0.116)	(0.070)	(0.108)	(0.230)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.513	0.540 ***	0.553 ***	0.560 ***	0.564 ***		
	(0.404)	(0.175)	(0.085)	(0.068)	(0.084)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.396 ***	0.448 ***	0.511 ***	0.591 ***	0.695 ***	0.838 ***	1.044 ***
	(0.085)	(0.073)	(0.065)	(0.068)	(0.090)	(0.139)	(0.236)
ALG	With	Without					
	0.654 ***	0.422 ***					
	(0.093)	(0.103)					
PET	With	Without					
	0.591 ***	0.551 ***					
	(0.093)	(0.102)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.860 ***	0.482 ***	0.224				
	(0.153)	(0.073)	(0.155)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.971 ***	0.795 ***	0.628 ***	0.469 ***	0.318 ***		
	(0.161)	(0.104)	(0.073)	(0.075)	(0.105)		
ENVK	Most ←						→ Least
	0.544 ***	0.509 ***	0.475 ***	0.442 **	0.410 *	0.379	0.349
	(0.073)	(0.100)	(0.138)	(0.179)	(0.222)	(0.265)	(0.308)
FORG	Least	Some	Moderate	High			
	-0.016	0.185	0.467 ***	0.892 ***			
	(0.199)	(0.129)	(0.071)	(0.126)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.10 Willingness to Pay for Organic Wool Gloves, Mail Survey

Variables	With Additional Definitions						
FEM	Female	Male					
	0.500***	0.495***					
	(0.079)	(0.066)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	0.754***	0.661***	0.534***	0.350***	0.061		
	(0.112)	(0.077)	(0.052)	(0.091)	(0.219)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.362	0.435***	0.469***	0.488***	0.501***		
	(0.366)	(0.156)	(0.072)	(0.050)	(0.062)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.063	0.229**	0.361***	0.470***	0.560***	0.636***	0.702***
	(0.183)	(0.117)	(0.075)	(0.054)	(0.052)	(0.063)	(0.080)
ALG	With	Without					
	0.583***	0.377***					
	(0.068)	(0.077)					
PET	With	Without					
	0.622***	0.251**					
	(0.062)	(0.098)					
POPD	200/mi^2	978/mi^2	10,000/mi$_2$				
	0.618***	0.464***	0.374***				
	(0.121)	(0.054)	(0.107)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.401***	0.452***	0.510***	0.577***	0.654***		
	(0.088)	(0.066)	(0.052)	(0.059)	(0.090)		
ENVK	Most ←						→ Least
	0.443***	0.320***	0.189	0.047	-0.107	-0.273	-0.453
	(0.059)	(0.090)	(0.138)	(0.203)	(0.289)	(0.401)	(0.548)
FORG	Least	Some	Moderate	High			
	0.230	0.353***	0.463***	0.561***			
	(0.225)	(0.126)	(0.058)	(0.072)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.11 Willingness to Pay for Organic Wool Gloves, Mail Survey

Variables	With Definitions and Additional Information						
FEM	Female	Male					
	0.483 ***	0.559 ***					
	(0.056)	(0.048)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	0.856 ***	0.730 ***	0.567 ***	0.351 ***	0.046		
	(0.086)	(0.058)	(0.037)	(0.060)	(0.137)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.427 *	0.480 ***	0.505 ***	0.519 ***	0.528 ***		
	(0.240)	(0.103)	(0.049)	(0.035)	(0.044)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.261 ***	0.347 ***	0.434 ***	0.522 ***	0.611 ***	0.700 ***	0.791 ***
	(0.075)	(0.058)	(0.044)	(0.037)	(0.041)	(0.054)	(0.073)
ALG	With	Without					
	0.612 ***	0.396 ***					
	(0.049)	(0.056)					
PET	With	Without					
	0.610 ***	0.386 ***					
	(0.047)	(0.061)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.723 ***	0.471 ***	0.314 ***				
	(0.084)	(0.039)	(0.078)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.606 ***	0.583 ***	0.558 ***	0.531 ***	0.503 ***		
	(0.067)	(0.049)	(0.038)	(0.041)	(0.059)		
ENVK	Most ←					→	Least
	0.486 ***	0.403 ***	0.317 ***	0.229 *	0.138	0.045	-0.051
	(0.040)	(0.059)	(0.086)	(0.118)	(0.156)	(0.199)	(0.250)
FORG	Least	Some	Moderate	High			
	0.094	0.269 ***	0.465 ***	0.685 ***			
	(0.134)	(0.081)	(0.040)	(0.056)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

In addition, the estimation also revealed that consumers who were younger, had higher income, had allergies and pets, lived in less populated neighborhoods or had higher degree of recognition of organic foods were more likely to pay more for a pair of organic labeled wool gloves. Surprisingly, educational levels did not significantly influence those who complete the survey without any additional explanations. Conversely, results from survey with definitions indicated that as respondents' educational achievements increased, their WTPs for organic wool products increased. Having a stronger belief in animal rights did not help to increase consumers' WTPs for organic attribute when the basic survey or the survey with additional information was completed. However in survey containing definitions and additional information, an increase in the belief for animal welfare led to a small decrease in WTP amount. When the additional definitions of attributes were provided with the survey, consumers' WTPs for organic wool gloves increased as their concerns for animal rights grew. Furthermore, the more aware a participant was about the environmental impacts caused from producing and dyeing fabric, the more they would pay for organic wool. Even though, some WTPs were not statistically significant.

The WTPs for environment-friendly attribute over acrylic attribute were presented in Table 5.12, Table 5.13, and Table 5.14. Only a few estimated WTPs were not statistically different from zero in all versions of survey. Once more, the results did not indicate that additional information and definitions would lead to an increase in respondents' WTPs for wool clarified as being environment-friendly. When participants who had limited knowledge about organic foods, the WTPs for the environment-friendly attribute increased by 20 cents when attribute description was provided within the survey.

Table 5.12 Willingness to Pay for Environment-friendly Wool Gloves, Mail Survey

Variables	Without Additional Information						
FEM	Female	Male					
	1.373 ***	1.389 ***					
	(0.119)	(0.108)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.601 ***	1.517 ***	1.417 ***	1.298 ***	1.153 ***		
	(0.212)	(0.135)	(0.083)	(0.120)	(0.217)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	1.225 ***	1.325 ***	1.372 ***	1.399 ***	1.416 ***		
	(0.446)	(0.203)	(0.101)	(0.080)	(0.100)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.943 ***	1.062 ***	1.209 ***	1.395 ***	1.638 ***	1.969 ***	2.447 ***
	(0.089)	(0.080)	(0.075)	(0.083)	(0.119)	(0.211)	(0.416)
ALG	With	Without					
	1.505 ***	1.190 ***					
	(0.114)	(0.112)					
PET	With	Without					
	1.420 ***	1.340 ***					
	(0.110)	(0.119)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	1.600 ***	1.324 ***	1.137 ***				
	(0.188)	(0.086)	(0.160)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	1.302 ***	1.324 ***	1.344 ***	1.363 ***	1.381 ***		
	(0.165)	(0.116)	(0.086)	(0.091)	(0.123)		
ENVK	Most	←					Least
	1.303 ***	1.166 ***	1.034 ***	0.905 ***	0.780 ***	0.658 **	0.539 *
	(0.084)	(0.111)	(0.146)	(0.184)	(0.223)	(0.267)	(0.316)
FORG	Least	Some	Moderate	High			
	0.557 ***	0.837 ***	1.229 ***	1.821 ***			
	(0.185)	(0.126)	(0.080)	(0.169)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.13 Willingness to Pay for Environment-friendly Wool Gloves, Mail Survey

Variables	With Additional Definitions						
FEM	Female	Male					
	1.122 ***	0.992 ***					
	(0.084)	(0.071)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.295 ***	1.209 ***	1.091 ***	0.921 ***	0.654 ***		
	(0.123)	(0.084)	(0.056)	(0.092)	(0.208)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.427	0.809 ***	0.983 ***	1.082 ***	1.147 ***		
	(0.396)	(0.157)	(0.073)	(0.051)	(0.067)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.625 ***	0.790 ***	0.923 ***	1.031 ***	1.120 ***	1.196 ***	1.262 ***
	(0.170)	(0.114)	(0.078)	(0.058)	(0.057)	(0.070)	(0.089)
ALG	With	Without					
	1.096 ***	1.002 ***					
	(0.073)	(0.083)					
PET	With	Without					
	1.123 ***	0.952 ***					
	(0.067)	(0.099)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	1.149 ***	1.026 ***	0.954 ***				
	(0.130)	(0.058)	(0.112)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.763 ***	0.877 ***	1.007 ***	1.156 ***	1.328 ***		
	(0.092)	(0.070)	(0.055)	(0.064)	(0.103)		
ENVK	Most ←					→	Least
	1.009 ***	0.901 ***	0.786 ***	0.661 ***	0.526 **	0.380	0.222
	(0.062)	(0.091)	(0.131)	(0.182)	(0.245)	(0.327)	(0.434)
FORG	Least	Some	Moderate	High			
	0.763 ***	0.897 ***	1.016 ***	1.123 ***			
	(0.225)	(0.130)	(0.061)	(0.078)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.14 Willingness to Pay for Environment-friendly Wool Gloves, Mail Survey

Variables	With Definitions and Additional Information						
FEM	Female	Male					
	1.227 ***	1.155 ***					
	(0.062)	(0.053)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.411 ***	1.330 ***	1.227 ***	1.088 ***	0.893 ***		
	(0.096)	(0.064)	(0.041)	(0.062)	(0.124)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.771 ***	1.030 ***	1.149 ***	1.217 ***	1.262 ***		
	(0.242)	(0.108)	(0.053)	(0.039)	(0.049)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.813 ***	0.937 ***	1.061 ***	1.187 ***	1.314 ***	1.442 ***	1.572 ***
	(0.075)	(0.059)	(0.047)	(0.043)	(0.049)	(0.066)	(0.092)
ALG	With	Without					
	1.264 ***	1.082 ***					
	(0.054)	(0.060)					
PET	With	Without					
	1.241 ***	1.126 ***					
	(0.052)	(0.065)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	1.345 ***	1.149 ***	1.027 ***				
	(0.095)	(0.043)	(0.082)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.957 ***	1.047 ***	1.143 ***	1.244 ***	1.352 ***		
	(0.069)	(0.052)	(0.041)	(0.046)	(0.069)		
ENVK	Most	←				→	Least
	1.134 ***	1.017 ***	0.897 ***	0.774 ***	0.647 ***	0.516 ***	0.381
	(0.044)	(0.062)	(0.086)	(0.114)	(0.146)	(0.185)	(0.232)
FORG	Least	Some	Moderate	High			
	0.649 ***	0.867 ***	1.110 ***	1.383 ***			
	(0.128)	(0.081)	(0.043)	(0.065)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

In the basic survey version, a person's gender and concern for animal welfare played no role in increasing WTPs for wool qualified for environment-friendly label. Similar to the organic attribute, the respondents from all versions of the survey who were younger, living in less populated districts, earning higher household income, owning pets, having allergies, or more familiar with organic foods were more willing to pay higher prices for environment-friendly certified wool products. Again, the more educated the individual was, the higher the premium the individual was willing to pay for the environment-friendly attribute. The differences of the WTPs between the lowest and the highest educational levels were 20 cents, 72 cents, and 49 cents for survey version A, B, and C, respectively. Income had the largest differences in WTPs between earning levels, with $1.51, 63 cents, and 76 cents difference for survey version A, B, and C, respectively. Lastly in all three versions, the results revealed that the more knowledgeable the respondents were about the environmental damages, the higher the value they would pay for environment-friendly wool gloves.

Table 5.15, Table 5.16, and Table 5.17 indicate the average premiums the respondents were willing to pay for animal-friendly wool products over acrylic products. Unlike the results from the previous three attributes, more WTPs were positively influenced by the provided explanations of the attributes and extra information. This result implies that the participants did not fully understand or were not as aware of the animal-friendly characteristic compared to the other three characteristics.

Table 5.15 Willingness to Pay for Animal-friendly Wool Gloves, Mail Survey

Variables	Without Additional Information						
FEM	Female	Male					
	0.906 ***	0.853 ***					
	(0.118)	(0.102)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.271 ***	1.111 ***	0.923 ***	0.699 ***	0.425 **		
	(0.221)	(0.135)	(0.081)	(0.114)	(0.203)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	1.030 **	0.928 ***	0.880 ***	0.853 ***	0.835 ***		
	(0.482)	(0.198)	(0.095)	(0.076)	(0.094)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.676 ***	0.735 ***	0.809 ***	0.902 ***	1.024 ***	1.190 ***	1.429 ***
	(0.090)	(0.080)	(0.073)	(0.077)	(0.105)	(0.172)	(0.307)
ALG	With	Without					
	0.859 ***	0.898 ***					
	(0.102)	(0.118)					
PET	With	Without					
	1.101 ***	0.581 ***					
	(0.115)	(0.105)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	1.107 ***	0.810 ***	0.608 ***				
	(0.179)	(0.082)	(0.153)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.209	0.496 ***	0.769 ***	1.029 ***	1.276 ***		
	(0.147)	(0.100)	(0.078)	(0.089)	(0.140)		
ENVK	Most ←					→	Least
	0.884 ***	0.896 ***	0.908 ***	0.920 ***	0.932 ***	0.943 ***	0.954 ***
	(0.082)	(0.112)	(0.154)	(0.201)	(0.249)	(0.297)	(0.345)
FORG	Least	Some	Moderate	High			
	0.210	0.438 ***	0.758 ***	1.241 ***			
	(0.175)	(0.123)	(0.078)	(0.157)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.16 Willingness to Pay for Animal-friendly Wool Gloves, Mail Survey

Variables	With Additional Definitions						
FEM	Female	Male					
	1.110 ***	0.817 ***					
	(0.101)	(0.074)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.257 ***	1.144 ***	0.991 ***	0.769 ***	0.418 **		
	(0.143)	(0.095)	(0.061)	(0.096)	(0.198)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	1.605 ***	1.204 ***	1.022 ***	0.917 ***	0.850 ***		
	(0.589)	(0.202)	(0.086)	(0.059)	(0.072)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.762 ***	0.837 ***	0.898 ***	0.947 ***	0.989 ***	1.024 ***	1.053 ***
	(0.173)	(0.122)	(0.085)	(0.063)	(0.063)	(0.077)	(0.096)
ALG	With	Without					
	1.067 ***	0.785 ***					
	(0.084)	(0.085)					
PET	With	Without					
	1.071 ***	0.713 ***					
	(0.076)	(0.103)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	1.095 ***	0.915 ***	0.810 ***				
	(0.152)	(0.063)	(0.118)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.226 **	0.493 ***	0.797 ***	1.145 ***	1.547 ***		
	(0.091)	(0.069)	(0.058)	(0.072)	(0.135)		
ENVK	Most ◄						► Least
	0.886 ***	0.749 ***	0.603 ***	0.445 **	0.274	0.089	-0.112
	(0.067)	(0.096)	(0.133)	(0.178)	(0.235)	(0.314)	(0.424)
FORG	Least	Some	Moderate	High			
	0.820 ***	0.880 ***	0.933 ***	0.982 ***			
	(0.241)	(0.143)	(0.069)	(0.086)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.17 Willingness to Pay for Animal-friendly Wool Gloves, Mail Survey

Variables	With Definitions and Additional Information						
FEM	Female	Male					
	1.024 ***	0.832 ***					
	(0.068)	(0.053)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.262 ***	1.131 ***	0.963 ***	0.738 ***	0.422 ***		
	(0.107)	(0.070)	(0.044)	(0.063)	(0.122)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	1.357 ***	1.086 ***	0.961 ***	0.890 ***	0.843 ***		
	(0.339)	(0.126)	(0.057)	(0.042)	(0.051)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.711 ***	0.782 ***	0.855 ***	0.928 ***	1.002 ***	1.076 ***	1.152 ***
	(0.077)	(0.062)	(0.049)	(0.043)	(0.049)	(0.066)	(0.090)
ALG	With	Without					
	0.981 ***	0.833 ***					
	(0.057)	(0.062)					
PET	With	Without					
	1.083 ***	0.654 ***					
	(0.058)	(0.064)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	1.100 ***	0.872 ***	0.730 ***				
	(0.103)	(0.044)	(0.083)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.220 ***	0.494 ***	0.786 ***	1.096 ***	1.425 ***		
	(0.068)	(0.050)	(0.041)	(0.050)	(0.085)		
ENVK	Most ←					→	Least
	0.885 ***	0.813 ***	0.740 ***	0.664 ***	0.586 ***	0.506 ***	0.423 **
	(0.046)	(0.064)	(0.089)	(0.116)	(0.144)	(0.174)	(0.206)
FORG	Least	Some	Moderate	High			
	0.483 ***	0.659 ***	0.856 ***	1.078 ***			
	(0.123)	(0.082)	(0.046)	(0.069)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

The female consumers were willing to pay 20 cents more for the animal-friendly attribute labeling when this attribute was briefly explained compared to the estimated WTP in the basic survey. Results also indicated that the information effects did not exist in the oldest age group, the highest educated group, the segment in which people were only slightly concerned about animal rights, or the segment where environmental damages were not recognized. The respondents who were between twenty-five and eighty-four years old were willing to pay slightly more for this attribute when more information about the attributes was given. The same findings were observed in consumers who had an annual household income equal to or less than $150,000. Consumers who had least a four-year college degree, allergies, no pets, or concern for animal welfare for majority amount of time would increase their WTPs when the additional attribute descriptions were provided. Furthermore, consumers who had a moderate knowledge about organic foods would be more likely to increase their WTPs when more information was included in the survey. These outcomes imply that consumers with a high degree familiarity of organic foods or more understanding about animal rights could be targeted as potential customers of animal-friendly products.

Additionally, the information was found to be effective in increasing the animal-friendly attribute's WTPs for subjects who were female, younger, less educated, earned a higher income, had pets at home, lived in the less populated area, or more familiar with organic foods. People who were greatly concerned about animal rights were found to be more likely to pay more for animal-friendly attribute. Interestingly, this result was different from the other three attributes. The effects from allergies and the knowledge of environmental impacts were different in three versions of survey. Results indicate that consumers without allergies and with some awareness of the environmental damages caused by producing fabrics would pay more for a pair of animal-

friendly wool gloves in the basic survey, but the opposite was true for the other two versions of the survey.

In sum, respondents were willing to pay more for wool gloves than acrylic gloves. In comparison to male participants, females would pay more for COO-focused, animal-friendly, and environmental-friendly attributes when additional information and/or definitions were provided. Younger consumers preferred organic, environmental-friendly, and animal-friendly attributes more than older consumers. The higher educational degree the individual received, the higher the price premiums the individual would pay for organic and environment-friendly attributes.

Also, the participants who had a higher income, pets, or more knowledge about organic foods were more likely to have higher WTPs for organic, environment-friendly, and animal friendly attributes. Compared with the respondents who had no allergies, the respondents with allergies appeared to be more willing to pay for COO, organic, and environment-friendly attributes. The influence from the population density of consumers' living neighborhoods was the only variable that was found to be consistent across all three versions of the survey and all the attributes. In this case, people who lived in more rural areas tended to have higher WTPs for these four attributes. Allergy sufferers were willing to pay more for these four attributes, except for the animal-friendly attribute in the basic version of survey. Belief in animal welfare had no impact on increasing an individual's WTPs for COO labeling but it did increase the WTPs for both environment-friendly and animal friendly attributes. Lastly, WTPs for environment-friendly and organic attributes were higher when the participants were given more knowledge about the environmental damages caused by producing and dyeing fabrics. Furthermore,

information was found to be the most effective method in increasing WTP for the animal-friendly attribute.

5.2.2 Results from the On-line Survey

Different from the mail survey, the on-line survey only contained versions A and C, which were defined earlier in the previous chapter. The same method (the analysis of variance) was utilized to test if the similarity of demographic and psychographic characteristics existed in the observations of these two versions of the survey. The one-way analysis of variance found that there were no significant differences in the respondents' characteristics between the two survey versions at the five percentage level (Table 5.18). Identical to the mail survey, this study used the pooled sample, in which the responses from both versions were combined.

Table 5.18 One-way Analysis of Variance for Effects of Survey Version on Demographic and Psychographic Variables, On-line Survey

Variables	df	SS	MS	F
Region				
Between groups	1	0.7445	0.7445	0.7219
Within groups	502	517.6821	1.0312	
Gender				
Between groups	1	0.5905	0.5905	2.8630 *
Within groups	502	103.5345	0.2062	
Marital				
Between groups	1	0.0381	0.0381	0.0251
Within groups	502	761.9302	1.5178	
Age				
Between groups	1	1.2843	1.2843	1.3441
Within groups	502	479.6661	0.9555	
Race				
Between groups	1	0.3534	0.3534	0.2247
Within groups	502	789.6446	1.5730	
Kids under 3				
Between groups	1	0.1933	0.1933	1.2617
Within groups	502	76.9000	0.1532	
Education				
Between groups	1	0.6515	0.6515	0.6449
Within groups	502	507.1501	1.0103	
Allergy				
Between groups	1	0.0723	0.0723	0.2882
Within groups	502	125.9099	0.2508	
Pet				
Between groups	1	0.4090	0.4090	2.0574
Within groups	502	99.8052	0.1988	
Income				
Between groups	1	2.2207	2.2207	0.9993
Within groups	502	1115.5809	2.2223	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5. 18 One-way Analysis of Variance for Effects of Survey Version on Demographic and Psychographic Variables, On-line Survey (continued)

Variables	df	SS	MS	F
Purchase Organic Fruit				
Between groups	1	0.0814	0.0814	0.0425
Within groups	502	962.2916	1.9169	
Purchase Organic Vegetable				
Between groups	1	0.0475	0.0475	0.0242
Within groups	502	986.7918	1.9657	
Purchase Organic Meat				
Between groups	1	0.1491	0.1491	0.0783
Within groups	502	955.6287	1.9036	
Purchase Organic Dairy Products				
Between groups	1	0.0082	0.0082	0.0039
Within groups	502	1045.9739	2.0836	
Purchase Organic Apparel				
Between groups	1	0.2875	0.2875	0.2011
Within groups	502	717.6947	1.4297	
Purchase Organic Bath and Bedding				
Between groups	1	0.8061	0.8061	0.5608
Within groups	502	721.5253	1.4373	
Purchase Organic Skin Care Products				
Between groups	1	0.0651	0.0651	0.0342
Within groups	502	955.5520	1.9035	
Familiarity with Organic Food				
Between groups	1	0.2474	0.2474	0.3590
Within groups	502	346.0303	0.6893	
Familiarity with Organic Cotton				
Between groups	1	0.7610	0.7610	0.8615
Within groups	502	443.4751	0.8834	
Familiarity with Organic Wool				
Between groups	1	0.3286	0.3286	0.3798
Within groups	502	434.4313	0.8654	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.18 One-way Analysis of Variance for Effects of Survey Version on Demographic and Psychographic Variables, On-line Survey (continued)

Variables	df	SS	MS	F
Environmental Impact of Growing Cotton				
Between groups	1	0.0069	0.0069	0.0024
Within groups	502	1475.0863	2.9384	
Environmental Impact of Manufacturing Polyester				
Between groups	1	4.6747	4.6747	2.4825
Within groups	502	945.3074	1.8831	
Environmental Impact of Manufacturing Rayon Fiber				
Between groups	1	5.9639	5.9639	3.2879 *
Within groups	502	910.5897	1.8139	
Environmental Impact of Dyeing Cotton Fabric				
Between groups	1	1.1238	1.1238	0.5402
Within groups	502	1044.3028	2.0803	
Environmental Impact of Dyeing Polyester Fabric				
Between groups	1	1.4852	1.4852	0.7696
Within groups	502	968.7291	1.9297	
Animal Right				
Between groups	1	1.0498	1.0498	0.5405
Within groups	502	974.9502	1.9421	
Recycle				
Between groups	1	0.0518	0.0518	0.0362
Within groups	502	716.7875	1.4279	
Prefer U.S. Products than Other Country of Origin				
Between groups	1	0.0304	0.0304	0.0270
Within groups	502	565.2057	1.1259	
Frequency of Shop or Eat at Local				
Between groups	1	2.2413	2.2413	2.0622
Within groups	502	545.5980	1.0868	
Likelihood of Trying New Restaurant				
Between groups	1	0.3610	0.3610	0.2465
Within groups	502	735.3037	1.4647	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

The conditional logit model was again utilized to estimate consumers' WTPs for US_AU, ORG, ENV, and ANIM_PRED attributes (Table 4.1) by using data collected from the on-line survey. Later, the same model was extended in order to investigate the information effects and the demographic effects.

In the basic model (Table 5.19), all coefficients were statistically significant at the one percent level. Thus, the conclusion that consumers appreciated and valued all additional wool labels could be made. In addition, both log-likelihood ratio and McFadden's R-square value were presented as the measurement of goodness-of-fit. Based on the log-likelihood ratio test, the data appeared to fit this model well.

Table 5.19 Estimated Results of the Basic Conditional Logit Model for On-line Survey

Variables	Coefficient	WTP
Price	-0.997 ***	
	(0.045)	
US_AU	0.473 ***	0.474 ***
	(0.025)	(0.028)
ORG	0.576 ***	0.578 ***
	(0.054)	(0.052)
ENV	0.863 ***	0.866 ***
	(0.054)	(0.053)
ANIM_PRED	0.224 ***	0.225 ***
	(0.023)	(0.024)
Number of observations		3084
Log-likelihood ratio		921.59
McFadden's (1974) log-likelihood ratio index		0.1078

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

The WTP estimations indicated that on average, the participants were willing to pay 47 cents more for a pair of U.S. wool gloves than a pair of Australian wool gloves, which was comparable to what has found in the mail survey (53 cents). Similar to the findings from the mail survey, the conclusion that the subjects preferred domestic goods over imported goods could be made. The participants were willing to pay 58 cents and 87 cents more on average for the organic and environment-friendly characteristics, respectively, compared to acrylic. The randomly selected sample (on-line survey) has a slightly higher WTP (5 cents higher) for organic wool products than the WTP determined in the mail survey. Consistent with the mail survey, the pro-environment attribute had the highest WTP among other attributes. In addition, the estimations indicated that on average, the respondents valued a pair of wool gloves labeled as animal friendly more than as predator-friendly by 23 cents.

Regardless of whether the sample was randomly selected or was specifically chosen based on consumers' interests, the results all suggested that certain portions of U.S. consumers preferred wool over acrylic products and U.S. wool over Australian wool. Similar conclusions to the mail survey could be drawn. The low recognition of organic garments could probably discourage the WTP for the organic attribute, even though the organic market is growing. Also, the attribute of environment-friendly could not be ignored for its ability to increase WTP for wool products.

To examine the information effects on WTPs, a dummy variable V was included. When V equaled zero, it represented the basic version of survey. If V equaled one, then it represented the survey with additional information and definition of the attribute. The conditional logit model was applied, and the results were shown in Table 5.20.

Table 5.20 Estimated Results of the Conditional Logit Model for On-line survey with the Definition and Information Effects

Variables	Coefficient	Willingness-to-Pay	
		The Basic Version	With Additional Information
Price	-1.108 ***		
	(0.063)		
US_AU	0.441 ***	0.398 ***	0.575 ***
	(0.036)	(0.034)	(0.050)
ORG	0.744 ***	0.671 ***	0.457 ***
	(0.076)	(0.068)	(0.082)
ENV	0.967 ***	0.873 ***	0.857 ***
	(0.077)	(0.070)	(0.083)
ANIM_PRED	0.227 ***	0.205 ***	0.250 ***
	(0.033)	(0.030)	(0.039)
Price_V	0.228 **		
	(0.090)		
US_AU_V	0.066		
	(0.050)		
ORG_V	-0.342 ***		
	(0.108)		
ENV_V	-0.213 **		
	(0.108)		
ANIM_PRED_V	-0.007		
	(0.047)		
Number of observations			3084
Log-likelihood ratio			937.54
McFadden's (1974) log-likelihood ratio index			0.1096

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

According to the log-likelihood ratio test, the data fit the model well. Similar to the results of the mail survey, the coefficients of the attributes themselves were all statistically different from zero at the one percent level (Table 5.5). Considering the interactions with the *V* variable, the parameters of price and pro-environment attributes were significantly different at the five percent level while the parameters of the organic attribute were significant at the one percent level. The results suggested that the information did not improve the WTPs for the organic and pro-environment attribute. In fact, after the information was offered, the WTP for the organic label dropped by 19 cents. On the contrary, the additional information increased the WTP for US_AU by 18 cents. Therefore, the information did help the participants distinguish the COO- and animal rights-related attributes. Regardless of whether additional information was offered or not, the environment-friendly attribute had a higher WTP than for the organic attribute.

Again, since the analysis of variance (Table 5.3) showed no significant differences between the survey versions for all the demographic and psychographic variables at the five percent level, the interactive terms had the direct effects from different versions of survey. In other words, demographic and psychographic characteristics were not responsible for the differences between the survey versions for WTPs.

The last model included the effects from the survey versions, demographic and psychographic variables. Table 5.21and Table 5.22 presented the relative WTPs, which subjects valued U.S. wool gloves more than Australian wool gloves. Only the WTP of the highest income level in survey version A and the WTP of the oldest age group in survey version C were not statistically different from zero. Information was found to be useful in increasing the WTPs of the COO-focused attributes for most of the consumer clusters except for subjects who had no

pets at home, no strong belief in animal welfare, or little knowledge about organic foods. As the respondents' age increased, the information effects on the WTP increased positively.

Table 5.21 Willingness to Pay for U.S. Wool Gloves over Australian Wool Gloves, On-line Survey

Variables	Without Additional Information						
FEM	Female	Male					
	0.427 ***	0.328 ***					
	(0.040)	(0.062)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	0.336 ***	0.386 ***	0.443 ***	0.508 ***	0.582 ***		
	(0.051)	(0.034)	(0.048)	(0.090)	(0.150)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.439 ***	0.419 ***	0.399 ***	0.380 ***	0.360 ***		
	(0.078)	(0.049)	(0.033)	(0.044)	(0.070)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.540 ***	0.481 ***	0.416 ***	0.347 ***	0.271 ***	0.188 **	0.096
	(0.063)	(0.045)	(0.034)	(0.038)	(0.053)	(0.074)	(0.099)
ALG	With	Without					
	0.404 ***	0.399 ***					
	(0.036)	(0.033)					
PET	With	Without					
	0.388 ***	0.418 ***					
	(0.040)	(0.063)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.479 ***	0.374 ***	0.240 **				
	(0.068)	(0.038)	(0.107)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.376 ***	0.383 ***	0.391 ***	0.401 ***	0.413 ***		
	(0.062)	(0.048)	(0.036)	(0.036)	(0.054)		
ENVK	Most	←				→	Least
	0.360 ***	0.395 ***	0.430 ***	0.465 ***	0.500 ***	0.535 ***	0.569 ***
	(0.036)	(0.034)	(0.036)	(0.043)	(0.053)	(0.066)	(0.080)
FORG	Least	Some	Moderate	High			
	0.980 ***	0.557 ***	0.387 ***	0.295 ***			
	(0.333)	(0.077)	(0.033)	(0.040)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.22 Willingness to Pay for U.S. Wool Gloves over Australian Wool Gloves, On-line Survey

Variables	With Definitions and Additional Information						
FEM	Female	Male					
	0.626 ***	0.427 ***					
	(0.060)	(0.088)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	0.432 ***	0.559 ***	0.758 ***	1.118 ***	1.963		
	(0.053)	(0.048)	(0.099)	(0.305)	(1.243)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	1.183 ***	0.799 ***	0.572 ***	0.423 ***	0.316 ***		
	(0.317)	(0.108)	(0.050)	(0.052)	(0.066)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.671 ***	0.620 ***	0.566 ***	0.511 ***	0.453 ***	0.393 ***	0.331 ***
	(0.074)	(0.057)	(0.048)	(0.052)	(0.067)	(0.088)	(0.112)
ALG	With	Without					
	0.583 ***	0.563 ***					
	(0.061)	(0.083)					
PET	With	Without					
	0.715 ***	0.371 ***					
	(0.079)	(0.047)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.617 ***	0.561 ***	0.514 ***				
	(0.094)	(0.053)	(0.107)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.128 **	0.229 ***	0.382 ***	0.641 ***	1.172 ***		
	(0.052)	(0.046)	(0.043)	(0.062)	(0.201)		
ENVK	Most	←				→	Least
	0.553 ***	0.573 ***	0.592 ***	0.610 ***	0.629 ***	0.647 ***	0.665 ***
	(0.054)	(0.050)	(0.054)	(0.063)	(0.077)	(0.094)	(0.112)
FORG	Least	Some	Moderate	High			
	0.396 ***	0.493 ***	0.580 ***	0.661 ***			
	(0.122)	(0.074)	(0.051)	(0.087)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

The results also revealed that the subjects who were willing to pay more for the COO-focused attribute in both types of survey had at least one of the following characteristics: female, older, less educated, lower income, lived in less crowded neighborhood, concerned animal rights, and had less knowledge about environmental damages caused from fabric manufacturing. Allergies seem to play no role in affecting WTP for the COO-focused label in either versions of the survey. The ownership of pets and the familiarity with organic foods resulted in different influences on the WTP in the two versions of survey. The participants who had no pet would pay slightly more for the COO-focused attribute than participants who had pets in the basic version survey. However in the survey with additional information, subjects who had pets at home would pay much more than their counterparts. The more familiar consumers were about organic foods, the higher the premiums they would pay in the version C survey. This conclusion is contradictory to conclusion found in the basic survey.

In Table 5.23 and Table 5.24, the WTPs for organic wool gloves over acrylic gloves are presented. Only a few estimators were not significant at the ten percent level, and all of the significant WTPs were positive except for the oldest age group. The estimations also implied that the information that was provided did not increase WTP for organic labeled wool products for most of the demographic and psychographic characteristics. The additional information did raise male consumers' WTPs for the organic attribute, as well as consumers with all levels of educational achievement, a household income less than $25,000, and/or no allergies.

Table 5.23 Willingness to Pay for Organic Wool Gloves, On-line Survey

Variables	Without Additional Information						
FEM	Female	Male					
	0.764 ***	0.482 ***					
	(0.085)	(0.116)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.234 ***	0.847 ***	0.410 ***	-0.084	-0.648 **		
	(0.141)	(0.080)	(0.081)	(0.157)	(0.318)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.381 ***	0.529 ***	0.677 ***	0.825 ***	0.973 ***		
	(0.144)	(0.090)	(0.068)	(0.106)	(0.175)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.205 *	0.410 ***	0.633 ***	0.874 ***	1.137 ***	1.424 ***	1.740 ***
	(0.105)	(0.077)	(0.068)	(0.090)	(0.142)	(0.223)	(0.340)
ALG	With	Without					
	0.648 ***	0.687 ***					
	(0.098)	(0.091)					
PET	With	Without					
	0.695 ***	0.610 ***					
	(0.083)	(0.120)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.218 **	0.865 ***	1.690 ***				
	(0.110)	(0.087)	(0.346)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.335 ***	0.451 ***	0.586 ***	0.747 ***	0.941 ***		
	(0.110)	(0.085)	(0.067)	(0.076)	(0.124)		
ENVK	Most	←			→		Least
	0.732 ***	0.676 ***	0.621 ***	0.565 ***	0.510 ***	0.455 ***	0.400 ***
	(0.076)	(0.068)	(0.070)	(0.079)	(0.094)	(0.112)	(0.131)
FORG	Least	Some	Moderate	High			
	-0.491	0.367 ***	0.712 ***	0.898 ***			
	(0.475)	(0.122)	(0.069)	(0.096)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.24 Willingness to Pay for Organic Wool Gloves, On-line Survey

Variables	With Definitions and Additional Information						
FEM	Female	Male					
	0.366 ***	0.704 ***					
	(0.093)	(0.170)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.004 ***	0.614 ***	0.0001	-1.108 **	-3.709		
	(0.121)	(0.087)	(0.135)	(0.506)	(2.790)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	-0.506	0.113	0.478 ***	0.719 ***	0.890 ***		
	(0.391)	(0.144)	(0.083)	(0.107)	(0.151)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.378 ***	0.416 ***	0.455 ***	0.496 ***	0.538 ***	0.582 ***	0.627 ***
	(0.111)	(0.089)	(0.081)	(0.091)	(0.117)	(0.153)	(0.193)
ALG	With	Without					
	0.210 **	0.831 ***					
	(0.095)	(0.152)					
PET	With	Without					
	0.480 ***	0.378 ***					
	(0.108)	(0.070)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.380 **	0.478 ***	0.560 ***				
	(0.149)	(0.088)	(0.186)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.257 ***	0.299 ***	0.364 ***	0.474 ***	0.699 ***		
	(0.099)	(0.084)	(0.073)	(0.092)	(0.202)		
ENVK	Most	←				→	Least
	0.665 ***	0.523 ***	0.383 ***	0.246 ***	0.110	-0.023	-0.155
	(0.098)	(0.084)	(0.082)	(0.093)	(0.113)	(0.140)	(0.174)
FORG	Least	Some	Moderate	High			
	-0.156	0.192	0.509 ***	0.799 ***			
	(0.243)	(0.121)	(0.083)	(0.144)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Results from both surveys indicated that as the respondents' age decreased, and educational levels and income increased, the WTPs increased. Similarly, the subjects who did not have allergies, had pets, were concerned about animal welfare, and/or more aware of environmental impacts and organic foods would have higher WTPs in both survey types. Different from the mail survey and the COO-focused attribute, results from the on-line survey showed that as the area in which the subjects become more densely populated, the higher the subjects' WTP for a pair of organic wool gloves became. Gender was the only variable that was not consistent in both versions of the survey. The female consumers paid more for organic attribute than the male consumers in the basic version survey, but the male consumers were willing to pay more than the female consumers once the information was provided within the survey. This finding was different from the mail survey conclusion.

The WTPs for the environment-friendly attribute over acrylic are presented in Table 5.25 and Table 5.26 Most of the WTPs were significant at the ten percent level, and all the significant WTPs were positive. Again, the results did not indicate that the additional information could increase the participants' WTPs for most of the consumer clusters for a pair of wool gloves that was labeled environment-friendly. The additional information improved WTPs for the consumers who were male, had no allergies, had pets at home, and/or were at least moderately knowledgeable about organic foods.

Table 5.25 Willingness to Pay for Environment-friendly Wool Gloves, On-line Survey

Variables	Without Additional Information						
FEM	Female	Male					
	0.981 ***	0.654 ***					
	(0.087)	(0.116)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.373 ***	1.037 ***	0.660 ***	0.233 *	-0.256		
	(0.143)	(0.082)	(0.080)	(0.140)	(0.267)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.449 ***	0.663 ***	0.877 ***	1.092 ***	1.306 ***		
	(0.142)	(0.091)	(0.070)	(0.109)	(0.186)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.525 ***	0.679 ***	0.846 ***	1.028 ***	1.226 ***	1.442 ***	1.680 ***
	(0.102)	(0.077)	(0.069)	(0.092)	(0.144)	(0.220)	(0.324)
ALG	With	Without					
	0.838 ***	0.902 ***					
	(0.096)	(0.090)					
PET	With	Without					
	0.919 ***	0.763 ***					
	(0.085)	(0.121)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.424 ***	1.064 ***	1.882 ***				
	(0.107)	(0.089)	(0.362)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.417 ***	0.571 ***	0.750 ***	0.964 ***	1.222 ***		
	(0.109)	(0.085)	(0.069)	(0.078)	(0.130)		
ENVK	Most	←			→		Least
	0.913 ***	0.876 ***	0.840 ***	0.803 ***	0.766 ***	0.730 ***	0.694 ***
	(0.077)	(0.070)	(0.072)	(0.081)	(0.096)	(0.114)	(0.133)
FORG	Least	Some	Moderate	High			
	0.663 *	0.825 ***	0.890 ***	0.926 ***			
	(0.344)	(0.119)	(0.071)	(0.094)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.26 Willingness to Pay for Environment-friendly Wool Gloves, On-line Survey

Variables	With Definitions and Additional Information						
FEM	Female	Male					
	0.796 ***	1.017 ***					
	(0.094)	(0.177)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	1.349 ***	1.005 ***	0.464 ***	-0.513	-2.805		
	(0.130)	(0.091)	(0.118)	(0.385)	(2.258)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.454	0.719 ***	0.875 ***	0.978 ***	1.051 ***		
	(0.284)	(0.132)	(0.084)	(0.110)	(0.151)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.790 ***	0.821 ***	0.853 ***	0.887 ***	0.922 ***	0.958 ***	0.996 ***
	(0.109)	(0.089)	(0.081)	(0.092)	(0.118)	(0.152)	(0.192)
ALG	With	Without					
	0.623 ***	1.211 ***					
	(0.091)	(0.164)					
PET	With	Without					
	1.001 ***	0.583 ***					
	(0.121)	(0.084)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.905 ***	0.837 ***	0.780 ***				
	(0.152)	(0.090)	(0.185)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.481 ***	0.565 ***	0.692 ***	0.907 ***	1.349 ***		
	(0.095)	(0.082)	(0.073)	(0.094)	(0.236)		
ENVK	Most	←				→	Least
	1.073 ***	0.922 ***	0.773 ***	0.627 ***	0.482 ***	0.340 ***	0.200
	(0.104)	(0.087)	(0.083)	(0.090)	(0.105)	(0.127)	(0.154)
FORG	Least	Some	Moderate	High			
	0.247	0.594 ***	0.911 ***	1.200 ***			
	(0.209)	(0.113)	(0.086)	(0.156)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

When no extra information was offered, the female respondents would pay more for the pro-environment labeled wool products (relative to similar acrylic products) than the male respondents. However, once the information was provided, the male subjects increased their WTPs by 33 cents, while the female subjects decreased theirs by 18 cents. The results from both versions of the survey suggested that individuals who were younger, highly educated, had higher income earnings, had no allergies, had pets at home, concerned about animal rights, knowledgeable about environmental issues caused by fabric manufacturing, and/or were familiar with organic foods would probably pay more for the environment-friendly attribute. Population density was another variable that was not consistent in both versions of the survey. In survey version A, people who lived in densely populated areas would pay more than people who lived in rural areas. Opposite results were observed in survey version C.

Lastly, Tables 5.27 and 5.28 presented the relative WTPs for the animal-focused attribute. Only a few WTPs were not significantly different from zero, but once again, all the significant WTPs were positive. Due to the differences between magnitudes throughout the demographic and psychographic variables were relative to other wool products with a different attribute rather than to an acrylic product, the values were smaller than those for the previous two attributes (organic and pro-environment).

Table 5.27 Willingness to Pay for "Pro-Animal" Wool Gloves over "Predator-Friendly" Wool Gloves, On-line Survey

Variables	Without Additional Information						
FEM	Female	Male					
	0.235 ***	0.135 **					
	(0.035)	(0.055)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	0.258 ***	0.216 ***	0.169 ***	0.115 *	0.054		
	(0.048)	(0.031)	(0.040)	(0.070)	(0.109)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.016	0.108 ***	0.201 ***	0.295 ***	0.388 ***		
	(0.066)	(0.042)	(0.030)	(0.044)	(0.073)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.169 ***	0.185 ***	0.202 ***	0.221 ***	0.242 ***	0.264 ***	0.289 ***
	(0.049)	(0.037)	(0.030)	(0.035)	(0.051)	(0.074)	(0.102)
ALG	With	Without					
	0.218 ***	0.197 ***					
	(0.034)	(0.030)					
PET	With	Without					
	0.226 ***	0.150 ***					
	(0.036)	(0.054)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.127 **	0.229 ***	0.358 ***				
	(0.054)	(0.035)	(0.112)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	0.047	0.098 **	0.158 ***	0.229 ***	0.314 ***		
	(0.053)	(0.041)	(0.031)	(0.032)	(0.051)		
ENVK	Most	←					Least
	0.201 ***	0.204 ***	0.206 ***	0.209 ***	0.212 ***	0.214 ***	0.217 ***
	(0.032)	(0.030)	(0.032)	(0.037)	(0.044)	(0.053)	(0.063)
FORG	Least	Some	Moderate	High			
	-0.033	0.142 **	0.212 ***	0.250 ***			
	(0.170)	(0.056)	(0.029)	(0.038)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.28 Willingness to Pay for "Pro-Animal" Wool Gloves over "Predator-Friendly" Wool Gloves, On-line Survey

Variables	With Definitions and Additional Information						
FEM	Female	Male					
	0.294 ***	0.129 ***					
	(0.045)	(0.072)					
AGE	Under 24	25-44	45-59	60-84	Over 85		
	0.091 **	0.230 ***	0.448 ***	0.841 ***	1.764		
	(0.045)	(0.038)	(0.075)	(0.245)	(1.133)		
EDUC	Elem.Sch.	High Sch.	2Yr College	4Yr College	Grad Sch.		
	0.464 ***	0.327 ***	0.246 ***	0.193 ***	0.155 **		
	(0.168)	(0.071)	(0.041)	(0.047)	(0.061)		
INC	<$15K	$15-25K	$25-35K	$35-75K	$75-100K	$100-150K	>$150K
	0.268 ***	0.257 ***	0.245 ***	0.232 ***	0.220 ***	0.206 ***	0.192 ***
	(0.044)	(0.039)	(0.038)	(0.040)	(0.047)	(0.057)	(0.070)
ALG	With	Without					
	0.262 ***	0.236 ***					
	(0.047)	(0.063)					
PET	With	Without					
	0.368 ***	0.062					
	(0.060)	(0.044)					
POPD	200/mi^2	978/mi^2	10,000/mi^2				
	0.357 ***	0.216 ***	0.098				
	(0.075)	(0.041)	(0.084)				
ANIMR	Not at all	Slightly	Partly	Mostly	Definitely		
	-0.036	0.029	0.127 ***	0.293 ***	0.633 ***		
	(0.049)	(0.041)	(0.035)	(0.043)	(0.123)		
ENVK	Most	←				→	Least
	0.214 ***	0.247 ***	0.279 ***	0.310 ***	0.341 ***	0.372 ***	0.402 ***
	(0.042)	(0.038)	(0.041)	(0.048)	(0.058)	(0.071)	(0.086)
FORG	Least	Some	Moderate	High			
	0.119	0.191 ***	0.255 ***	0.315 ***			
	(0.103)	(0.059)	(0.039)	(0.065)			

The numbers in parentheses denote standard errors.

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

The additional information helped to increase the average assessment for pro-animal wool products over predatory-friendly wool products when the subjects were female, between twenty-five and eighty-four years old, earned a household income less than 35,000 dollars, had pets at home, lived in a neighborhood with less than two hundred people in a square mile, and/or had some degree of familiarity with organic foods. The respondents who had a strong belief in animal welfare had experience an increase in their WTP values by 32 cents after they were educated about the animal-focused attributes.

Regardless of the additional information being offered or not, female subjects had higher assessment for the pro-animal label over the predatory-friendly label than male subjects. Similar to the subjects who had allergies, pets, or both would be willing to pay more, compared to those who did not have any allergies or pets. Unlike the other attributes (COO, organic, and pro-environment), the animal-focused WTP estimations reacted differently with the provided information. Respondents, who were older, less educated, earned a lower level of household income, and/or lived in more rural neighborhoods were less likely to pay more for the animal-focused attribute, but they would increase their WTPs after the information was provided within the survey. In both versions of the survey (version A and C), individuals who were knowledgeable about organic foods, and/or concerned about animal welfare tended to be more likely to have higher assessments than those who paid less attention to organic foods and/or animal rights.

Similar to the mail survey, the WTPs were higher for the wool products than the acrylic products. Female subjects had higher assessments for the COO-focused and the animal-focused labels than male subjects. Once the male subjects were educated by the information included in the survey, they would pay more for the pro-environment and the organic labeling than the

female participants. The results also revealed that individuals who were younger, had a higher level of education, had no allergies, and/or earned a higher level of household income would pay more for the organic and pro-environment attributes. The participants also were more likely to pay more for all of the attributes except for the COO-focused attribute in the basic version of survey when they owned pets at home. In addition, the WTPs for all the attributes increased as the concern for animal welfare increased. The estimations also suggested that as the awareness of the environmental issues increased, the WTPs for the organic and pro-environment certified products would increase. Lastly, the results indicated that the respondents who were more familiar with organic foods would be more likely to pay more for the organic, pro-environment, animal-focused, and COO-focused (only in survey version C) labels.

5.2.3 The Comparison between the Mail and On-line Survey

The findings from the mail survey and the on-line survey were the same for some of the attributes. In both types of the survey, the female subjects had higher assessments toward the COO-focused labeling than the male subjects. The older respondents appeared to be more likely to pay more for the COO-focused labels than the younger respondents. However, educational achievements did not help to increase the WTP for the COO-focused attribute. The participants who had obtained a higher education level, had a higher level of household income, and/or had more knowledge about environmental impacts caused from fabric manufacturing were willing to pay more for the organic or environment-friendly certified wool gloves.

Furthermore, the results also found that the subjects who had pets at home would have higher WTPs for organic, pro-environment, and animal-friendly related labels than those who did

not own any pets. In the basic version of both survey (mailing and on-line), the influences from population density were found to be consistent for the organic label, environment-friendly, and animal-focused labels, where the WTPs for these attributes were higher in densely populated neighborhood compared to rural neighborhood. The concern about animal rights would increase the WTPs for both the pro-environment attribute and animal-focused attribute. The familiarity with organic foods seems to be the most consistent characteristic in both types of survey. Results indicated that the familiarity with organic foods would increase the WTPs for the following attributes: organic, pro-environment, pro-animal, and COO-focused (only for the survey with additional information).

5.3 Results of the Consumer Segments Models

5.3.1 Results from the Mail Survey

The same data set that was used for a conditional logit model was reorganized to estimate the effects of consumers' demographic and psychographic characteristics on product purchasing decisions. As noted earlier, analysis of variance found little differences among demographic and psychographic characteristics among the three versions of survey (Table 5.3). All demographic characteristics were found to have insignificant differences in their means between the three versions of survey. The means of the psychographic characteristics from each survey version were only significantly different for the following variables: frequency of purchasing organic fruits, vegetables, apparel, and skin care products. Therefore, this research combined the responses from all versions as a whole sample to estimate the consumers' preferences in terms of their demographic and psychographic natures excluding, frequency of purchasing organic commodities.

To gain an insight on the differences across the consumer segments defined for this study (Section 4.2.2), another one-way analysis of variance was used to reveal if any of the demographic and psychographic variables were significantly different across the segments. Incomplete observations were omitted from the sample, so the sample size decreased from 595 to 581. Half of demographic variables were found to be significantly different across consumer segments (gender, marital, age, race, and education) as indicated in Table 5.29. For the psychographic variables, the one-way analysis of variance showed that the frequencies of

purchasing organic meat, dairy products, and bath and bedding products were not significantly different across the consumer segments. The subjects' familiarity of organic cotton, knowledge of environmental impacts of growing cotton and dyeing cotton fabric were significant different among consumer segments at the ten percent, five percent, and five percent level, respectively. The results also revealed that there were significant differences between categories based on variables such as preference of U.S. grown food products (at ten percent level), support of local business (at ten percent level), and likelihood of trying new restaurants (at five percent level).

Table 5.29 One-way Analysis of Variance for Effects of Segment on Demographic and Psychographic Variables, Mail Survey

Variables	df	SS	MS	F
Region				
Between groups	4	8.1215	2.0304	1.9441
Within groups	576	601.5653	1.0444	
Gender				
Between groups	4	2.2197	0.5549	2.2355 *
Within groups	576	142.9783	0.2482	
Marital				
Between groups	4	2.8398	0.7100	3.3687 ***
Within groups	576	121.3943	0.2108	
Age				
Between groups	4	5.4370	1.3592	1.9633 *
Within groups	576	398.7730	0.6923	
Race				
Between groups	4	17.2638	4.3159	2.5211 **
Within groups	576	986.0547	1.7119	
Kids under 3				
Between groups	4	0.2193	0.0548	0.6266
Within groups	576	50.3832	0.0875	
Education				
Between groups	4	20.1384	5.0346	4.2752 ***
Within groups	576	678.3160	1.1776	
Allergy				
Between groups	4	0.3227	0.0807	0.3420
Within groups	576	135.8804	0.2359	
Pet				
Between groups	4	1.1627	0.2907	1.2731
Within groups	576	131.5052	0.2283	
Income				
Between groups	4	7.0791	1.7698	0.8080
Within groups	576	1261.6197	2.1903	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.29 One-way Analysis of Variance for Effects of Segment on Demographic and Psychographic Variables, Mail Survey (continued)

Variables	df	SS	MS	F
Purchase Organic Fruits				
Between groups	4	17.6770	4.4193	2.3551 *
Within groups	576	1080.8496	1.8765	
Purchase Organic Vegetables				
Between groups	4	16.5653	4.1413	2.1712 *
Within groups	576	1098.6842	1.9074	
Purchase Organic Meat				
Between groups	4	4.3001	1.0750	0.6210
Within groups	576	997.0665	1.7310	
Purchase Organic Dairy Products				
Between groups	4	10.7183	2.6796	1.1583
Within groups	576	1332.5037	2.3134	
Purchase Organic Apparel				
Between groups	4	17.6273	4.4068	4.1673 ***
Within groups	576	609.1128	1.0575	
Purchase Organic Bath and Bedding			2.2534	1.9098
Between groups	4	9.0137	1.1799	
Within groups	576	679.6472		
Purchase Organic Skin Care Products			4.6665	2.3223 *
Between groups	4	18.6659	2.0094	
Within groups	576	1157.4408		
Familiarity with Organic Food			0.3568	0.8844
Between groups	4	1.4273	0.4035	
Within groups	576	232.3903		
Familiarity with Organic Cotton				
Between groups	4	7.9060	1.9765	2.0068 *
Within groups	576	567.3091	0.9849	
Familiarity with Organic Wool				
Between groups	4	5.5499	1.3875	1.2617
Within groups	576	633.4139	1.0997	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.29 One-way Analysis of Variance for Effects of Segment on Demographic and Psychographic Variables, Mail Survey (continued)

Variables	df	SS	MS	F
Environmental Impact of Growing Cotton				
Between groups	4	9.5707	2.3927	2.8178 **
Within groups	576	489.0971	0.8491	
Environmental Impact of Manufacturing Polyester				
Between groups	4	7.7652	1.9413	1.5589
Within groups	576	717.2950	1.2453	
Environmental Impact of Manufacturing Rayon Fiber				
Between groups	4	7.3366	1.8342	1.5573
Within groups	576	678.4155	1.1778	
Environmental Impact of Dyeing Cotton Fabric				
Between groups	4	8.2273	2.0568	1.9676 *
Within groups	576	602.1307	1.0454	
Environmental Impact of Dyeing Polyester Fabric				
Between groups	4	7.4776	1.8694	1.5169
Within groups	576	709.8408	1.2324	
Animal Right				
Between groups	4	14.5045	3.6261	1.6964
Within groups	576	1231.2477	2.1376	
Recycle				
Between groups	4	5.0245	1.2561	1.2100
Within groups	576	597.9738	1.0381	
U.S. Products				
Between groups	4	39.4689	9.8672	13.8407 ***
Within groups	576	410.6378	0.7129	
Local Business Support				
Between groups	4	8.4434	2.1109	2.3830 *
Within groups	576	510.2244	0.8858	
New Restaurant				
Between groups	4	11.4232	2.8558	3.1062 **
Within groups	576	529.5648	0.9194	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

The multinomial logit model was used to examine how individuals' demographic and psychographic characteristics differed in each consumer segment. The estimated coefficients and marginal effects are presented in Table 5.30 and Table 5.31. Impacts of variables such as

allergy histories, pet ownership, knowledge of environmental damages, and familiarity of organic wool were found not to differ significantly across consumer segments. The remaining variables in the model were significantly different from each other in at least one consumer segment. The following section discusses how both demographic and psychographic characteristics affected the probabilities of the individual being categorized into each group.

Table 5.30 Estimated Coefficients of Multinomial Logit Model, Mail Survey

	Pr(Animal-focused)	Pr(Environment-focused)	Pr(Acrylic)	Pr(Cheapest Wool)
CONSTANT	0.2202	-1.4267	-0.6496	-2.7994
	(1.0779)	(1.5968)	(1.4508)	(1.7683)
FEMALE	-0.2320	-0.1474	-0.7558 **	0.5107
	(0.2278)	(0.3419)	(0.3014)	(0.3803)
AGE	-0.0419	0.1933	-0.2673	0.4164 *
	(0.1368)	(0.2093)	(0.1755)	(0.2366)
EDUC	0.2721 **	0.0578	0.5153 ***	-0.1707
	(0.1065)	(0.1590)	(0.1432)	(0.1745)
ALLERGY	-0.0163	0.2222	0.0630	-0.0175
	(0.2205)	(0.3384)	(0.2845)	(0.3659)
PET	0.0133	-0.3833	-0.1984	-0.0714
	(0.2355)	(0.3415)	(0.2992)	(0.4016)
INCOME	-0.2102 **	-0.0668	-0.2818 ***	0.0176
	(0.0820)	(0.1217)	(0.1065)	(0.1318)
POPDENS	0.1488	0.0294	0.3348	-0.3264 *
	(0.1537)	(0.1929)	(0.2162)	(0.1977)
NEAST	0.4599	0.5294	-0.1483	0.2677
	(0.3243)	(0.5168)	(0.4601)	(0.6193)
SOUTH	0.2395	0.6243	0.1246	0.7835 *
	(0.2729)	(0.4157)	(0.3564)	(0.4656)
WEST	0.2534	0.5725	0.5315	1.0975 **
	(0.3068)	(0.4711)	(0.3780)	(0.4878)
ANIMR	0.0589	-0.1407	0.0586	0.2221
	(0.0826)	(0.1221)	(0.1072)	(0.1457)
ENVK	0.1269	0.0659	0.2036 *	0.1810
	(0.0960)	(0.1455)	(0.1168)	(0.1283)
LOCALBIZ	-0.1093	-0.1982	-0.4099 ***	0.0616
	(0.1185)	(0.1783)	(0.1573)	(0.1873)
NEWREST	0.3032 **	0.3918 **	0.0338	0.4726 ***
	(0.1189)	(0.1684)	(0.1673)	(0.1720)
FORGFOOD	-0.3314 *	-0.1798	0.1521	-0.3589
	(0.1918)	(0.2799)	(0.2441)	(0.2948)
FORGWOOL	0.1138	0.1509	-0.1595	0.0392
	(0.1119)	(0.1610)	(0.1509)	(0.1693)

*The numbers in parentheses denote standard errors, and *, **, *** denote statistical significance at 10, 5, and 1% levels, respectively.*

The coefficients for the probability of the subjects who belong to the COO-focused group are normalized zero.

Table 5.31 Estimated Marginal Effects of Multinomial Logit Model, Mail Survey

	Pr(COO-focused)	Pr(Animal - focused)	Pr(Environment-focused)	Pr(Acrylic)	Pr(Cheapest Wool)
Constant	0.0914	0.2145	-0.1052	-0.0473	-0.1534 *
	(0.2051)	(0.2162)	(0.1218)	(0.1511)	(0.0921)
FEMALE	0.0535	-0.0209	0.0031	-0.0789 **	0.0432 **
	(0.0426)	(0.0456)	(0.0263)	(0.0310)	(0.0211)
AGE	0.0030	-0.0130	0.0191	-0.0353 **	0.0262 **
	(0.0259)	(0.0272)	(0.0161)	(0.0179)	(0.0124)
EDUC	-0.0529 ***	0.0389 *	-0.0112	0.0465 ***	-0.0214 **
	(0.0200)	(0.0213)	(0.0123)	(0.0146)	(0.0092)
ALLERGY	-0.0064	-0.0154	0.0184	0.0057	-0.0024
	(0.0418)	(0.0443)	(0.0251)	(0.0292)	(0.0198)
PET	0.0191	0.0314	-0.0314	-0.0187	-0.0004
	(0.0436)	(0.0467)	(0.0285)	(0.0320)	(0.0216)
INCOME	0.0388 **	-0.0329 **	0.0059	-0.0209 *	0.0091
	(0.0155)	(0.0162)	(0.0093)	(0.0108)	(0.0070)
POPDENS	-0.0268	0.0243	-0.0056	0.0337	-0.0256 **
	(0.0287)	(0.0307)	(0.0144)	(0.0227)	(0.0100)
NEAST	-0.0755	0.0953	0.0246	-0.0456	0.0011
	(0.0625)	(0.0669)	(0.0385)	(0.0404)	(0.0244)
SOUTH	-0.0679	0.0099	0.0374	-0.0121	0.0328
	(0.0526)	(0.0548)	(0.0315)	(0.0369)	(0.0240)
WEST	-0.0920	-0.0189	0.0228	0.0363	0.0519 *
	(0.0561)	(0.0602)	(0.0342)	(0.0447)	(0.0294)
ANIMR	-0.0097	0.0108	-0.0163 *	0.0036	0.0117
	(0.0155)	(0.0167)	(0.0093)	(0.0112)	(0.0078)
ENVK	-0.0290	0.0122	-0.0029	0.0146	0.0052
	(0.0185)	(0.0179)	(0.0109)	(0.0113)	(0.0063)
LOCALBIZ	0.0346	0.0026	-0.0077	-0.0404 **	0.0109
	(0.0222)	(0.0240)	(0.0138)	(0.0162)	(0.0100)
NEWREST	-0.0581 **	0.0445 *	0.0185	-0.0220	0.0171 *
	(0.0228)	(0.0230)	(0.0125)	(0.0173)	(0.0088)
FORGFOOD	0.0348 *	-0.0759 **	0.0015	0.0453 **	-0.0058
	(0.0196)	(0.0330)	(0.0131)	(0.0207)	(0.0138)
FORGWOOL	-0.0103	0.0285	0.0047	-0.0216	-0.0013
	(0.0139)	(0.0228)	(0.0090)	(0.0183)	(0.0061)

*The numbers in parentheses denote standard errors, and *, **, *** denote statistical significance at 10, 5, and 1% levels, respectively.*

In the COO-focused category, only two demographic variables and two psychographic variables were found to be significant. As a subject's education increased by one level, the probability of this person being categorized into the COO-focused group decreased by 0.05, when holding everything else constant. However, the probability of a subject belonging to this focused segment would increase by 0.04 when the subject's income increased by one level provided that rest of variables remaining unchanged. The estimated marginal effects also revealed that a person who was willing to try the new restaurant in his or her neighborhood had a lower probability of being in this group. On the other hand, subjects who had higher degree of familiarity about organic food would be more probable to belong to this category, given all other variables stayed the same. The results implied that subjects who are more willing to try a new restaurant may also more willing to try products with new labels, giving that COO attribute are more familiar by consumers than other attributes, such as environment-friendly and animal-friendly.

The same variables as in the COO-focused segment were found to have similar significant influences between the Animal-focused group and the rest of groups. However, all these variables had opposite marginal effects on the probability, compared with those in the Animal-focused group. The outcome indicated that the probability of a consumer being categorized into the COO-focused segment would increase by 0.04 as the individual received one level higher in educational degree with everything else staying constant. Income had a negative effect on consumers' preferences for Animal-focused labeled products. As the income increased one level, the chance that this subject would favor products considered animal rights, would decrease by 0.03, holding the rest of variables constant. Unlike consumers who valued COO, the more willing the subjects were to trying new restaurants within the first week of their opening, the

more likely were the subjects to choose products that showed concern for animal rights. However, consumers would be less interested in animal-friendly products, if they were more knowledgeable about organic food.

The probability of individuals being sorted into the Environment-focused group was influenced only by the degree of the participant's belief in animal rights. The stronger the consumers' belief in animal rights were, the less likely that the consumer would prefer products that have Environment-focused attributes over commodities with other attributes such as animal-friendly, the cheapest price, COO, and Acrylic.

The individuals who belonged to the Acrylic group appeared to be older, with higher education degree, with less income, and were more likely to be male. According to the estimated results, holding all other variables constant, if a participant was a female, the probability of her choosing the Acrylic gloves would be 0.08 less than male subjects. Again, with everything else remaining constant, the marginal effect of the respondents, who were in the next higher age category, decreased the probability of favoring acrylic products by 0.04. Both marginal effects for gender and age were statistically significant at the five percent level.

Moreover, the marginal effect of obtaining the next level of education degree increased the probability by 0.05, holding all other variables unchanged. The respondent's income was found to have a negative effect on the subjects' preference of the Acrylic. Holding all other variables constant, when a participant's income increased one level, the likelihood of this subject preferring the Acrylic would drop by 0.02. The results also indicated that consumers who lived in a denser populated area were more likely to buy the Acrylic. Only two psychographic marginal effects (supporting local business and familiarity of organic foods) were statistically significant at the five percent level. The results implied that the more the respondents were

willing to support local business, the less likely the subject would purchase the Acrylic. On the contrary, people who perceived themselves as being more familiar with organic foods would be more willing to buy the Acrylic.

Lastly, the respondents who were wool-preferring but price-conscious (i.e., the Cheapest Wool segment) seemed to be older, lower educated, or were female. Holding all other variables constant, if the individual was a female or was in the one level older age group, the likelihood of this subject belonging to the Cheapest Wool segment would increase by 0.04 and 0.03, respectively. The marginal effects also revealed that as a consumer's educational achievement increased by one level, the probability of this person being categorized into the segment of the Cheapest Wool would decrease by 0.02. Unlike how people who preferred acrylic were more likely to live in urban area, people who favored the cheapest wool were more likely to reside in a less densely populated district. The Cheapest Wool category was the only category that the probability was influenced by an individual's location of residence. The estimated results indicated that if the participant was from the West, the likelihood of this person belonging to the Cheapest Wool group would increase by 0.05 provided everything else unchanged. The marginal effect also indicated that the more willing a respondent was to try new restaurants in town, the higher the probability that this individual would prefer wool over acrylic gloves. However, this individual was not concerned with other attributes besides the cheapest price.

In summary, the male consumers favored acrylic and the female consumers, who tended to be more price conscious, favored wool more. Older participants preferred wool over acrylic, but they typically looked for the Cheapest Wool. Education variable was statistically significant across all the segments besides the Environment-focused group. The participants who had higher educational attainment were more likely to purchase Animal-focused and Acrylic

products. On the other hand, people who had lower educational attainment preferred the COO-focused and the Cheapest Wool better. Income was also an important factor across the different segments. The consumers with higher incomes tended to be more interested in the COO-focused commodities, rather than the Animal-focused and the Acrylic products. People, who lived in densely populated areas, seemed to prefer the Acrylic, whereas people who were from less densely populated areas were more likely to be the wool-preferring but price-conscious consumers. For the psychographic part, consumers who have showed higher degree of familiarity with organic foods tended to be more likely to belong to the COO-focused and the Acrylic groups, and not the Animal-focused segment. People who were more interested in purchasing the Animal-focused and the Cheapest Wool products appeared to be more interested in trying new restaurants in their area within one week of their opening.

Table 5.32 Actual and Predicted Distributions of the Respondents across the Segments, Mail Survey

Predicted:	COO-focused	Animal-focused	Environment-focused	Acrylic	Cheapest Wool	Total
Actual:						
COO-focused	75	84	0	8	1	168
Animal-focused	50	163	0	6	1	220
Environment-focused	13	36	1	4	1	55
Acrylic	20	55	0	17	0	92
Cheapest Wool	11	29	1	0	5	46
Total	169	367	2	35	8	581

Table 5.32 reports how the respondents were distributed across the segments in actual and predictions. For example, the model predicted 163 subjects in the Animal-focused group correctly of the total 220 subjects who were actually in the Animal-focused group. The predictability rates were 44.64 percent for the COO-focused group, 74.09 percent for the

Animal-focused group, 1.82 percent for the Environment-focused group, 18.48 percent for the Acrylic group, and 10.87 percent for the Cheapest Wool group. Overall, the model predicted 44.92 percent of respondents correctly.

The Environment-focused group obviously had the worst predictability, where 9.47 percent of the participants belonged to this segment, but only 0.34 percent of participants were predicted by the model. Therefore, the model captured characteristics of individuals who belonged to the Animal-focused segment relatively well, but not the individuals who belonged to the Environment-focused segment.

5.3.2 Results from the On-line Survey

Analogous to the mail survey sample, the subjects were assigned into five groups, and then the analysis of variance was applied to examine if consumers in one segment were significantly different from other segments in terms of their demographic and psychographic natures. The results showed that there were no difference found in regions, gender, marital status, race, household with children under three years old, and income (Table 5.33**Error! Reference source not found.**). Age was found to be significantly different at the one percent level as well as both allergies and ownership of pets were discovered to be significantly different at the ten percent level. The conclusions for age and income were the same as what had found in the mail survey.

With regards to the psychographic characteristics, the analysis revealed that significant variations at least at the five percent level were found between consumer segments in the frequency of shopping for organic products (fruits, vegetables, meats, dairy products, apparel, bath and bedding products, and skin care products), familiarity with organic goods (food, cotton,

and wool), and knowledge of environmental impacts from producing and processing fabric. The significant differences were also observed at the one percent level concerning the belief of animal rights and the likelihood of trying new restaurants, provided that everything else was hold constant. Compared to the results for the psychographic variables from mail survey, the likelihood of trying new restaurants was found to be significantly different from consumer segments in both on-line and mail survey. Furthermore, frequency of purchasing organic commodities (fruits, vegetables, apparel, and skin care products), familiarity with organic cotton, and knowledge of environmental impacts of growing and dyeing cotton were all found to be different between consumer categories in both mailing and web based survey.

Table 5.33 One-way Analysis of Variance for Effects of Segment on Demographic and Psychographic Variables, On-line Survey

Variables	df	SS	MS	F
Region				
Between groups	4	2.1602	0.5401	0.5220
Within groups	499	516.2664	1.0346	
Gender				
Between groups	4	1.2536	0.3134	1.5202
Within groups	499	102.8714	0.2062	
Marital				
Between groups	4	8.6361	2.1590	1.4301
Within groups	499	753.3321	1.5097	
Age				
Between groups	4	21.6011	5.4003	5.8664 ***
Within groups	499	459.3493	0.9205	
Race				
Between groups	4	6.6430	1.6607	1.0579
Within groups	499	783.3550	1.5698	
Kids under 3				
Between groups	4	0.1847	0.0462	0.2997
Within groups	499	76.9085	0.1541	
Education				
Between groups	4	6.9808	1.7452	1.7389
Within groups	499	500.8208	1.0036	
Allergy				
Between groups	4	2.2484	0.5621	2.2668 *
Within groups	499	123.7338	0.2480	
Pet				
Between groups	4	1.8227	0.4557	2.3109 *
Within groups	499	98.3916	0.1972	
Income				
Between groups	4	9.9740	2.4935	1.1231
Within groups	499	1107.8276	2.2201	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5. 33 One-way Analysis of Variance for Effects of Segment on Demographic and Psychographic Variables, On-line Survey (continued)

Variables	df	SS	MS	F
Purchase Organic Fruit				
Between groups	4	41.0208	10.2552	5.5542 ***
Within groups	499	921.3522	1.8464	
Purchase Organic Vegetable				
Between groups	4	44.1118	11.0279	5.8373 ***
Within groups	499	942.7275	1.8892	
Purchase Organic Meat				
Between groups	4	23.2748	5.8187	3.1137 **
Within groups	499	932.5030	1.8687	
Purchase Organic Dairy Products				
Between groups	4	26.5347	6.6337	3.2471 **
Within groups	499	1019.4474	2.0430	
Purchase Organic Apparel				
Between groups	4	26.8115	6.7029	4.8392 ***
Within groups	499	691.1706	1.3851	
Purchase Organic Bath and Bedding		26.1199	6.5300	4.6803 ***
Between groups	4	696.2114	1.3952	
Within groups	499			
Purchase Organic Skin Care Products		42.9351	10.7338	5.8686 ***
Between groups	4	912.6819	1.8290	
Within groups	499			
Familiarity with Organic Food		10.7365	2.6841	3.9917 ***
Between groups	4	335.5413	0.6724	
Within groups	499			
Familiarity with Organic Cotton				
Between groups	4	10.7103	2.6776	3.0820 **
Within groups	499	433.5258	0.8688	
Familiarity with Organic Wool				
Between groups	4	8.8058	2.2014	2.5790 **
Within groups	499	425.9542	0.8536	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

Table 5.33 One-way Analysis of Variance for Effects of Segment on Demographic and Psychographic Variables, On-line Survey (continued)

Variables	df	SS	MS	F
Environmental Impact of Growing Cotton				
Between groups	4	38.1102	9.5275	3.3085 **
Within groups	499	1436.9831	2.8797	
Environmental Impact of Manufacturing Polyester				
Between groups	4	20.7329	5.1832	2.7834 **
Within groups	499	929.2492	1.8622	
Environmental Impact of Manufacturing Rayon Fiber				
Between groups	4	27.5613	6.8903	3.8676 ***
Within groups	499	888.9923	1.7815	
Environmental Impact of Dyeing Cotton Fabric				
Between groups	4	30.8631	7.7158	3.7949 ***
Within groups	499	1014.5635	2.0332	
Environmental Impact of Dyeing Polyester Fabric				
Between groups	4	30.0165	7.5041	3.9827 ***
Within groups	499	940.1978	1.8842	
Animal Right				
Between groups	4	36.1420	9.0355	4.7972 ***
Within groups	499	939.8580	1.8835	
Recycle				
Between groups	4	4.0938	1.0235	0.7165
Within groups	499	712.7455	1.4283	
Prefer U.S. Products than Other Country of Origin				
Between groups	4	2.8477	0.7119	0.6317
Within groups	499	562.3884	1.1270	
Frequency of Shop or Eat at Local				
Between groups	4	4.5886	1.1471	1.0537
Within groups	499	543.2507	1.0887	
Likelihood of Trying New Restaurant				
Between groups	4	34.4854	8.6214	6.1355 ***
Within groups	499	701.1792	1.4052	

, **, * denote statistical significance at 10, 5, and 1% levels, respectively.*

To investigate how consumers' characteristics influenced their preferences in shopping for wool products, a multinomial logit model was again used. The detail of estimated coefficients and marginal effects were presented in Table 5.34 and Table 5.35, respectively. The individual's gender, income, living region, and familiarity of organic cotton and wool products were discovered to have no significant impacts on which consumer segment the respondents belonged. Differences between the remaining characteristics were statistically significant for at least one consumer group. The estimated marginal effects showed consistency for the variable of familiarity with organic wool products in both mailing and on-line surveys. To identify how an individual's natures influenced the probabilities of the certain subject being categorized into each consumer section, the marginal effects were further analyzed in the following paragraphs.

Table 5.34 Estimated Coefficients of Multinomial Logit Model, On-line Survey

	Pr(Animal - focused)	Pr(Environment-focused)	Pr(Acrylic)	Pr(Cheapest Wool)
CONSTANT	-1.0898	-3.2060 *	1.2270	1.3771
	(1.1112)	(1.8493)	(1.1282)	(1.0006)
FEMALE	0.5047	0.1874	0.0812	0.4237
	(0.3456)	(0.4360)	(0.3541)	(0.3070)
AGE	-0.1936	-0.1328	0.3860 **	-0.3302 **
	(0.1518)	(0.2007)	(0.1632)	(0.1415)
EDUC	-0.1289	-0.3351 *	-0.3845 **	0.0322
	(0.1460)	(0.2002)	(0.1672)	(0.1334)
ALLERGY	0.3505	-0.2303	0.6674 **	0.4288 *
	(0.2779)	(0.3830)	(0.3051)	(0.2571)
PET	0.4093	0.1544	0.1486	-0.2737
	(0.3405)	(0.4506)	(0.3486)	(0.2804)
INCOME	0.1666	0.1689	0.0889	0.0320
	(0.1038)	(0.1381)	(0.1154)	(0.0962)
POPDENS	-0.3054 *	0.7967	-0.2384	-0.2151
	(0.1817)	(0.5333)	(0.1917)	(0.1817)
NEAST	-0.4085	-0.6574	-0.3224	-0.2765
	(0.3853)	(0.5329)	(0.4264)	(0.3642)
SOUTH	-0.1455	-0.2102	-0.0761	0.2543
	(0.3538)	(0.4462)	(0.3903)	(0.3298)
WEST	-0.7645 *	-0.6217	-0.3836	-0.2302
	(0.4358)	(0.6087)	(0.4545)	(0.3845)
ANIMR	0.0451	0.0266	-0.2552 **	-0.3024 ***
	(0.1213)	(0.1580)	(0.1206)	(0.1047)
ENVK	-0.0281	-0.2979 ***	0.0312	-0.0555
	(0.0532)	(0.0913)	(0.0576)	(0.0494)
LOCALBIZ	-0.0670	0.3263	0.0443	0.0574
	(0.1438)	(0.2034)	(0.1478)	(0.1324)
NEWREST	-0.0032	-0.0306	-0.2405 *	-0.3967 ***
	(0.1189)	(0.1568)	(0.1455)	(0.1211)
FORGFOOD	0.4925 ***	0.3457	-0.0113	0.4933 ***
	(0.1889)	(0.2613)	(0.1983)	(0.1771)
FORGWOOL	-0.0494	0.0004	-0.3060	-0.0085
	(0.1653)	(0.2174)	(0.1902)	(0.1538)

*The numbers in parentheses denote standard errors, and *, **, *** denote statistical significance at 10, 5, and 1% levels, respectively.*
The coefficients for the probability of the individuals who belong to the COO-focused category are normalized to zero.

Table 5.35 Estimated Marginal Effects of Multinomial Logit Model, On-line Survey

	Pr(COO-focused)	Pr(Animal-focused)	Pr(Environment-focused)	Pr(Acrylic)	Pr(Cheapest Wool)
Constant	-0.0553	-0.2562 *	-0.1775 **	0.1452	0.3438 **
	(0.1807)	(0.1521)	(0.0769)	(0.1183)	(0.1737)
FEMALE	-0.0791	0.0517	-0.0025	-0.0218	0.0516
	(0.0564)	(0.0454)	(0.0205)	(0.0397)	(0.0514)
AGE	0.0281	-0.0216	-0.0024	0.0652 ***	-0.0693 ***
	(0.0246)	(0.0215)	(0.0093)	(0.0167)	(0.0247)
EDUC	0.0281	-0.0084	-0.0130	-0.0409 **	0.0342
	(0.0239)	(0.0207)	(0.0093)	(0.0177)	(0.0231)
ALLERGY	-0.0873 *	0.0156	-0.0266	0.0541 *	0.0441
	(0.0453)	(0.0389)	(0.0183)	(0.0322)	(0.0444)
PET	-0.0066	0.0723 *	0.0068	0.0170	-0.0895 *
	(0.0522)	(0.0424)	(0.0198)	(0.0351)	(0.0517)
INCOME	-0.0206	0.0208	0.0055	0.0034	-0.0091
	(0.0172)	(0.0145)	(0.0064)	(0.0122)	(0.0166)
POPDENS	0.0367	-0.0388 *	0.0479 **	-0.0171	-0.0287
	(0.0337)	(0.0233)	(0.0218)	(0.0187)	(0.0295)
NEAST	0.0790	-0.0365	-0.0221	-0.0113	-0.0091
	(0.0650)	(0.0567)	(0.0243)	(0.0456)	(0.0595)
SOUTH	-0.0060	-0.0364	-0.0134	-0.0134	0.0692
	(0.0557)	(0.0514)	(0.0221)	(0.0411)	(0.0570)
WEST	0.1002	-0.0886	-0.0180	-0.0120	0.0183
	(0.0712)	(0.0561)	(0.0289)	(0.0485)	(0.0659)
ANIMR	0.0356 *	0.0317 *	0.0072	-0.0199	-0.0546 ***
	(0.0190)	(0.0170)	(0.0074)	(0.0125)	(0.0178)
ENVK	0.0106	0.0010	-0.0139 ***	0.0088	-0.0064
	(0.0088)	(0.0076)	(0.0043)	(0.0061)	(0.0087)
LOCALBIZ	-0.0084	-0.0189	0.0158 *	0.0025	0.0090
	(0.0233)	(0.0205)	(0.0093)	(0.0156)	(0.0232)
NEWREST	0.0478 **	0.0295 *	0.0062	-0.0127	-0.0708 ***
	(0.0203)	(0.0169)	(0.0073)	(0.0158)	(0.0214)
FORGFOOD	-0.0452	0.0366	0.0076	-0.0411	0.0421 ***
	(0.0455)	(0.0109)	(0.0058)	(0.0472)	(0.0114)
FORGWOOL	0.0491	0.0046	0.0032	-0.0660	0.0092
	(0.0379)	(0.0114)	(0.0063)	(0.0423)	(0.0121)

*The numbers in parentheses denote standard errors, and *, **, *** denote statistical significance at 10, 5, and 1% levels, respectively.*

Three variables were found to be significantly different from the COO-focused group and other attributes focused groups. The signs of the marginal effects showed that consumers who were more willing to try the new opening restaurants in their area and who had stronger animal rights beliefs were more likely to be sorted into the COO-focused group, which were opposite to the findings from the mail survey. The magnitude of the marginal effects implied that if the subject had at least one kind of allergies, the probability of this person belonging to the COO-focused category would decrease by 0.09, when the rest of variables remained the same.

In the Animal-focused segment, two psychographic variables (willingness of trying the new restaurants and belief in animal rights) had the similar influences as in the COO-focused section. These results were also consistent with the mail survey. At the ten percent level of statistical significance, these two variables were discovered to have positive relationships with the probability of the Animal-focused group, while holding other variables unchanged. If the individual owned at least one pet at home, the probability of this person belonging to this segment would increase by 0.07, holding everything else constant. In addition, the more urban neighborhood the participant resides in, the less probable that the participant favors the Animal-friendly products.

The consumers were more likely to belong to the Environment-focused segment when their psychographic characteristics indicated motivation for supporting business around their neighborhood and more consumer knowledge about environmental damage caused from producing and processing fabrics. Also, the results implied that people, who lived in a more dense area, tended to like products featuring environment-friendly attributes.

None of the psychographic factors were found to have effects on the probability of an individual being categorized into the Acrylic segment. The consumers, who were older and had

at least one kind of allergies, would be more likely to prefer acrylic products over wool products. As an individual's education increased by one level, the probability of this individual being grouped into the Acrylic category would decrease by 0.04, provided that everything else was held constant.

Unlike the Acrylic, the respondents who were wool-preferring but price-conscious tended to be younger. This finding is completely opposite to the outcome from the mail survey. If an individual's age increased by one age level, the probability of a consumer being categorized into this segment would decrease by 0.07 given that everything else stayed the same. The probability of being categorized into the wool preferring group decrease by 0.09, when the participant had at least one pet at home, holding the remaining variables unchanged. An individual who had a stronger belief in animal rights and showed more interests in trying new restaurants tended to be less likely to choose the Cheapest Wool. In addition, the estimated marginal effect indicated that consumers who were more familiar with organic foods would increase their probabilities of choosing the Cheapest Wool at the one percent level, holding everything else constant.

To summarize, people who had a stronger belief in animal rights seem to be more likely to be categorized into the COO-focused and Animal-focused segments, rather than the Cheapest Wool segment. Similar, consumers who had showed more interest in trying at new restaurants within a week of opening probably belonged to the COO-focused and the Animal-focused segments, instead of the Cheapest Wool group. People who had higher likelihood of supporting local businesses or had more knowledge of environmental impacts caused from fabric production and processing seemed to prefer the Environment-focused products. This research also found that the younger the consumers were the more likely the consumers would purchase the Cheapest Wool and the less likely they would prefer the Acrylic. Individuals who had at least one kind of

allergies were less likely to prefer the COO-focused products over other focused groups, but were more likely to prefer the Acrylic over other categories. As expected, people who owned at least one pet at home revealed that they were more interested in consuming Animal-focused wool products. However, they indicated fewer interests in purchasing the Cheapest Wool rather than other wool and acrylic products. This research also found that consumers who lived in a neighborhood with higher population density had a decreased probability of preferring the Animal-focused goods but an increased likelihood of belonging to the Environment-focused category.

Table 5.36 Actual and Predicted Distributions of the Respondents across the Segments, On-line Survey

Predicted:	COO-focused	Animal-focused	Environment-focused	Acrylic	Cheapest Wool	Total
Actual:						
COO-focused	82	10	6	9	40	147
Animal-focused	35	30	2	3	28	98
Environment-focused	13	4	4	3	20	44
Acrylic	31	9	0	19	18	77
Cheapest Wool	41	13	1	12	71	138
Total	202	66	13	46	177	504

The actual and predicted distributions of the respondents across the segments are reported in Table 5.36. The table shows, for example, the model predicted 82 subjects in the COO-focused group correctly, where in total, 147 subjects were actually in the COO-focused group, and the model predicted 202 of them belonged to this group. In addition, the predictability rates for the COO-focused, Animal-focused, Environment-focused, Acrylic group, and the Cheapest Wool segments were 55.78, 30.61, 9.09, 24.68, and 51.45 percent, respectively. Overall, 40.87 percent

of respondents were correctly predicted by the model. With on-line sample, the COO-focused and the Cheapest Wool segments were predicted the most accurately.

Similar to the mail sample, the Environment-focused group had the lowest predictability, where 8.73 percent of the respondents actually belonged to this group, but only 2.58 percent of respondents were predicted by the model. Thus, the model could not capture characteristics of subjects who were categorized into the Environment-focused group.

5.3.3 The Comparison between the Mailing and On-line Survey

The estimated marginal effects were discovered to be statistically significant for different variables between the mailing and the on-line surveys. Six estimated marginal effects were statistically significant at least at the ten percent level in both samples. Those variables were the willingness to try new restaurants in the COO-focused, the Animal-focused, and the Cheapest Wool groups; age in both the Acrylic and the Cheapest Wool groups; and the education variable in the Acrylic group. Puzzlingly, opposite directional impacts were found for five out of the six factors with statistically significant marginal effects (Table 5.37).

A probably cause for this inconsistency in results is the difference in the samples obtained for the two surveys. In addition to the difference in demographic factors, which were accounted for in the model, lifestyles of individuals from two samples may have differed. Further, there were a time difference of nearly a year in when the surveys were administered and the variation in the choice experiment design for the two types of survey (one more attribute, predator-friendly was added for subjects to select in the on-line survey). Considering the rapid changes in lifestyle and raising concerns of environmental impacts and other social values, it might not be surprising

that a year's difference found distinct perspectives towards the products' attributes provided in the survey. The only consistency in both versions of the survey was that the subjects who were willing to try new restaurants were more likely to be categorized into the Animal-focused segment.

Table 5.37 Comparison of the Estimated Marginal Effects with Statistical Significance between the Mail and On-line Surveys

	Mailing survey	On-line survey
AGE	The older the individuals were, the less possible they would choose the Acrylic.	Opposite conclusion
	The older the individuals were, the more possible they would choose the Cheapest Wool.	Opposite conclusion
EDUC	The higher educational degree the subject received, the higher possibility the subject preferred the Acrylic.	Opposite conclusion
NEWREST	The more willing to try the new restaurant within a week of its opening the participants were, the less likely they would belong to the COO-focused segment.	Opposite conclusion
	The more willing to try the new restaurant within a week of its opening the participants were, the more likely they would belong to the Animal-focused segment.	The same conclusion
	The more willing to try the new restaurant within a week of its opening the participants were, the more likely they would belong to the Cheapest Wool segment.	Opposite conclusion.

To further investigate whether the inconsistent findings between the mail and on-line samples could be attributed to the differences in the samples, the same multinomial logit model was re-estimated with more disaggregated samples using versions A, B, and C from the two

surveys. It turned out that due to an insufficient number of subjects in the Cheapest Wool group in the version B, the results could not used to compare to the other two versions. The marginal effects from these disaggregated samples are reported in the Appendix C. Comparing the samples for versions A and C (combining the mail and on-line responses) found relatively more consistent marginal effects. When the version A samples from the mail and on-line survey were compared or ,the version C samples from the mail and on-line surveys were compared, inconsistencies similar to the comparison between the mail and on-line surveys were found.

The exercise seems to suggest that the inconsistencies found between the mail and on-line surveys could be attributed to the differences in the samples. Once again, compared to the on-line survey participants, the mail survey participants were older, more educated, and with higher income. The inconsistencies cast doubt on the representativeness of the two samples of the general U.S. population.

CHAPTER 6 - Conclusions

The objectives of this study were to understand consumers' preferences for wool production attributes by estimating the WTP values and identifying characteristics of consumers with preferences towards certain attributes. The mail and on-line surveys were conducted to gather information on consumers' demographic, socioeconomic, and psychographic characteristics. In the survey, choice experiment was applied to assess consumers' preferences of wool products' attributes. This study consisted of two parts: estimating the WTPs for wool attributes and explaining whether or not the consumer segments can be identified from consumer characteristics. The conditional logit and multinomial logit model were used to analyze consumers' WTP for wool attributes and consumer segments, respectively.

The first part of this dissertation concerned consumers' WTPs for wool products with various production attributes such as country of origin, organic, animal-friendly, and environment-friendly. Results were similar to previous studies on consumers' preferences for these attributes in other goods. As for organic food (e.g., Gil, Gracia, and Sanchez, 2000; Loureiro and Hine, 2001; Dransfield et al, 2005), organic cotton (Hustvedt, 2006), locally grown food products (e.g., Govindasamy, Italia, and Thatch, 1999; Loureiro and Hine, 2001), the survey respondents were willing to pay more for organic, animal-friendly, or environment-friendly wool produced in the U.S. The findings suggest that not only food consumers (Makatouni, 2002), but also apparel consumers purchased organic items not only because of health concerns but also for the environmental and animal welfare concerns. Similarly, apparel consumers considered ethical issues during production, and were willing to pay more for

products that concerned about labor welfare, as was found for food consumers previously (Pollin, Justine and Heintz, 2004).

Results from this research likely offer encouragement to the U.S. wool industry. First, the selected consumers were found to be more interested in purchasing wool products than acrylic products. Findings from this research also suggested that it is beneficial for wool producers to differentiate their products by labeling products' attributes, such as organic, animal-friendly, and environment-friendly. Organic and environment-friendly wool products have a fledgling market in the world, and the findings suggest these two attributes cannot be substituted by acrylic. Therefore, marketing products using these two labels offers a probable opportunity to successfully increase wool growers' revenues. Clearly, additional research is needed to assess whether increases in the cost of producing products with these attributes would not exceed the potential increases in revenue.

Another useful finding is that compared with other attributes, environment-friendly averaged the highest WTP in both types of survey. Especially in the mail sample, the environment-friendly attribute received more than twice as much as the organic attribute. Since the organic standard encompasses the environment-friendliness, it would be less costly to produce environment-friendly wool than organic wool. Therefore, producing environment-friendly wool has a better chance of yielding higher net revenue for wool growers than organic wool. This finding likely applies to the "green" industry in general, warranting additional investigation.

In marketing these production attributes, it should be noted that additional information provided with the surveys (mail and on-line) did not increase the WTPs for both organic and environment-friendly attributes but rather decreased them. Information seemed have had a

greater effect on the environment-friendly than organic attribute in the mail survey (a drop of 17 versus 5 cents), and the opposite effect was found with the on-line sample (a drop of 1 versus 19 cents). These outcomes suggest that the provided information affected respondents with higher income (mail survey sample) and those with lower income (on-line survey sample) differently.

The impacts of consumers' demographics on their WTP for these value-based attributes were consistent with most previous findings. Results here indicated that female and older respondents in both survey samples had higher WTP values for the COO-focused label than male and younger respondents (similar to Patterson et al., 1997; Howard and Allen, 2006). Results from both surveys suggest that respondents who had acquired higher education levels (different from Robert, 1996 and Armah, 2002, but similar to Hustvedt, 2006) and had higher levels of income (similar to Armah, 2002 and Hustvedt, 2006, but opposite to Robert, 1996 would be more likely to pay a price premium for organic or environment-friendly attribute.

Organic, environment, and animal-friendly related labels received higher price premiums from subjects who had pets than those who did not own any pet. Furthermore, both environment-focused and animal-focused attributes received higher WTP values from subjects with higher concerns about animal welfare. As expected, those with more understanding about environmental issues related to fabric producing were more willing to pay for organic or environment-friendly attributes, and the respondents who were more familiar with organic foods were more likely to pay more for the organic, pro-environment, and pro-animal labels. Above findings imply the importance of targeting different groups of consumer with different characteristics.

The second part of this dissertation examined segments of consumer interested in various wool attributes. A multinomial logit model was used to reveal the relationship between the wool

attributes and consumers' characteristics. The results from the mail and on-line survey were not consistent with each other, which was attributed to the differences among the participants in the two samples that were not captured by the model variables. Regardless, the results strongly implied that consumer segments did exist, consistent with what Roberts (1996) had found for socially responsible consumers. From both types of survey, the results showed that subjects who were willing to try a new restaurant within its first week of business were more likely to be purchase wool products based on animal-focused information. Results indicated that the older mail survey respondents were more likely to choose Acrylic and the Cheapest Wool, while these two attributes were preferred by the younger on-line survey respondents. In addition, the Acrylic was preferred by the higher educated mail survey participants and the lower educated on-line survey participants. In the on-line survey, environmental concern was found to have a positive influence on consumers' preferences for environment-focused products, which was different from Kim and Damhorst's (1998) finding. Similar to the discoveries from first analysis, these results underline the necessity to promote wool product attributes to different consumer segments.

For both survey samples, the model predicted the respondent belonging to the Environment-focused segment poorly. On the other hand, the respondents belonging to the Animal-focused, the COO-focused, or the Cheapest Wool segments were predicted with relatively higher accuracy. The results suggest that perhaps it is more challenging to identify consumers whose buying decisions are driven by environment-related factors, since they may be more ubiquitous than those who are more motivated by animal-related facotrs, loyalty to the place of residence, or price consciousness.

A nationally-regulated labeling system in apparel production is already available for organic and COO for the place of manufacturing. However, the current labeling system does not require

the COO for the place where wool is produced. Moreover, such regulations have not yet been developed for environment-friendly and animal-friendly processes. Results from this research encourage the wool industry to pursue establishing standards on production processes that are environment-friendly and respect animal welfare. Such labeling systems could bring price premium for wool products to enhance revenue for woolgrowers. Any promotion of production attributes must be strategically implemented towards specified consumer segments, based on a solid understanding of consumer demographics and psychographics.

References

2004 – 2005 statistical highlights of U.S. Agriculture, Livestock, USDA, NASS. Internet site: http://www.usda.gov/nass/pubs/stathigh/2005/lvstkindex.htm (Accessed July 12, 2006).

Aadland, D. and A.J. Caplan (2003). "Willingness to Pay for Curbside Recycling with Detection and Mitigation of Hypothetical Bias." *American Journal of Agricultural Economics* 85 (2003):492-502.

Abbott, M.J. "Promoting Wool Internationally: The Formation of the International Wool Secretariat." *Australian Economic History Review* 38 (November, 1998):258-79.

Adams, P. "Bioclip Presents New Era in Wool Harvesting". (2003) Internet site: http://www.abc.net.au/landline/stories/s990785.htm (Accessed September 7, 2006).

Agriculture 21, Food and Agriculture Organization of the United Nations. "Organic Farming." January 1999. Internet site: http://www.fao.org/AG/magazine/9901sp3.htm (Accessed April 05, 2006).

Agricultural Marketing Resource Center. "Lamb Wool." 2006. Internet site: http://www.agmrc.org/agmrc/commodity/livestock/lamb/lamb+wool.htm (Accessed April 05, 2006).

Aguilar, F.X. and R.P. Vlosky. "Consumer Willingness to Pay Price Premiums for Environmentally Certified Wood Products in the U.S." *Forest Policy and Economics* 9 (May 2007):1100-12.

American Sheep Industry Association. Internet site: http://www.sheepusa.org/ (Accessed July 11, 2006).

American Sheep Industry Association. "About American Wool." 2006. Internet site: http://www.sheepusa.org/?page=site/text&nav_id=06b30b9c925056e3635d644c8ae9a29b (Accessed September 28, 2006).

Anderson, R.C. and E.N. Hansen. "The Impact of Environmental Certification on Preference for Wood Furniture: A Conjoint Analysis Approach." *Forest Products Journal* 54(2004):42-50.

Animal Welfare Information Center, National Agricultural Library, United States Department of Agriculture. Internet site:

http://awic.nal.usda.gov/nal_display/index.php?info_center=3&tax_level=1&tax_subject=170 (Accessed October 04, 2006)

Appleby, M.C. "The Relationship Between Food Prices and Animal Welfare." *Journal of Animal Science* 83(2005):E9-E12.

Appleby, M.C. "Alternatives to Conventional Livestock Production Methods." In G. J. Benson and B.E. Rollin, ed. *The Well-being of Farm Animals: Challenges and Solutions.* Ames, Iowa : Blackwell Pub (2004):339-50.

Armah, P.W. "Setting Eco-label Standards in the Fresh Organic Vegetable Market of Northeast Arkansas." *Journal of Food Distribution Research.* 33(2002):35-45.

Askegarrd, S. and T. Madsen. "Homogeneity and Heterogeneousness in European Food Cultures: An Exploratory Analysis." 24th EMAC Conference, ESSEC 16-19 May, 1995: 25-47. Paris.

Auger, P. et al. "What Will Consumers Pay for Social Product Features?" *Journal of Business Ethics* 42 (2003):281-304.

Australian Wool Services Limited. Internet site: http://www.wool.com (Accessed June 22, 2006).

Australian Wool and Sheep Industry Task-force. "Mulesing." Internet site: http://www.woolisbest.com/animal_welfare/mulesing/index.html (Accessed April 05, 2006).

Baughn, C. and A. Yaprak. Mapping Country of Origin Research: Recent Developments and Emerging Avenues. In Papadopulos, N. G. and L. A. Heslop. "Product-Country Images: Impact and Role in International Marketing." *New York and Landon: International Business Press* (1993):89-115.

Becker, T., E. Benner, and K. Glitsch. "Consumer Perception of Fresh Meat Quality in Germany." *British Food Journal* 102(2000c):246-66.

Beharrel, B. and H. J. H. MacFie. "Consumer Attitudes to Organic Foods." *British Food Journal* 93(1991): 25-30.

Bergeron, D.P., and M.N. Carver. "Student Preferences for domestic-made or imported apparel as influenced by shopping habits." *Journal of Consumer Studies and Home Economics* 12(1988):87-94.

Bjørner, T.B., L. Hansen and C.S. Russell. "Environmental Labeling and Consumers' Choice – An Empirical Analysis of The Effect of The Nordic Swan." *Journal of Environmental Economics and Management* 47(2004):411-34.

Blackburn, M., G.W. Harrison, and E.E. Rutstrom. "Statistical Bias Functions and Informative Hypothetical Survey." *American Journal of Agricultural Economics* 76(December 1994):1084-88.

Bovine Somatotropin (BST). Internet site: http://www.co-op.co.uk/corporate/index.php?pageid_grp=34 (Accessed October 08, 2006).

Brooker, J.R. and D.B. Eastwood. "Using State Logos to Increase Purchases of Selected Food Products" *Journal of Food Distribution Research* 20(1989):175-83.

Brown, T.C., I. Ajzen and D. Hrubes. "Further Tests of Entreaties to Avoid Hypothetical Bias in Referendum Contingent Valuation." *Journal of Environmental Economics and Management* 46(2003):353-61.

Bureau of Economic Analysis, U.S. Department of Commerce. Internet site: https://bea.gov/ (Accessed July 22, 2006).

Cameron, T.A. and D. Huppert. "OLS versus ML Estimation of Non-market Resource Values With Payment Card Interval Data." *Journal of Environmental Economics and Management* 17(1989):230-46.

Carlin, W, A. Glyn, J. V. Reenen. "Export Market Performance of OECD Countries: An Empirical Examination of the Role of Cost Competitiveness." *Economic Journal* 111 (January, 2001):128-62.

Chakraborty, K. "Consumers' Attitude Towards Hormone-Free Milk: What Have We Learned?" *Applied Economics Letters* 12(2005):633-37.

Clemens, R. and B.A. Babcock. "Country of Origin as a Brand: The Case of New Zealand Lamb." Briefing Paper, Midwest Agribusiness Trade Research and Information Center, Iowa State University. (November 2004)

Cotton and Wool Situation and Outlook Yearbook, Economic Research Service, USDA, November 2005.

Cotton Incorporated. Internet site: http://www.cottoninc.com/ (Accessed July 23, 2006)

Courtney, P. “Qld growers tap into organic wool market.” LandLine, Australian Broadcasting Corportation, May 2005. Internet site: http://www.abc.net.au/landline/content/2005/s1376463.htm (Accessed January 18, 2006).

Cummings, R.G., D.S. Brookshire, and W.D. Schulze. 1986. *Valuing Environmental Goods: A State of the Arts Assessment of the Contingent Method*. Totowa, N.J.: Rowman and Allanheld.

Cummings, R.G., S. Elliott, G.W. Harrison, and J. Murphy. “Are Hypothetical Referenda Incentive Compatible?” *Journal of Political Economy* 105 (1997):609-621.

Cummings, R.G., and L.O. Taylor. “Unbiased Value Estimates for Environmental Goods: A Cheap Talk Design for the Contingent Valuation Method.” *American Economic Review* 89(1999):649-65.

Dickerson, K. “Retailers and Apparel Imports: Variables Associated With Relative Proportions of Imports Carried.” *Journal of Consumer Studies and Home Economics*, 13 (1989):129-49.

Dickson, M.A. “Utility of No Sweat Labels for Apparel Consumers: Profiling Label Users and Predicting Their Purchases.” *The Journal of Consumer Affairs*, 35 (2001): 96-119.

Dimitri, C. and L. Oberholtzer. “Organic Price Premiums Remain High.” Amber Wavers, U.S. Department of Agriculture, September 2005. Internet site: http://www.ers.usda.gov/AmberWaves/September05/Findings/OrganicPrice.htm (Accessed January 18, 2006).

Dransfield, E., T.M. Ngapo, N.A. Nielsen, L. Bredahl, P.O. Sjoden, M. Magnusson, M. M. Campo, and G.R. Nute. “Consumer Choice and Suggested Price for Pork as Influenced by Its Appearance, Taste and Information Concerning Country of Origin and Organic Pig Production.” *Meat Science* 69(2005):61-70.

Dufour, A. and J.-P. Loisel. “Les Opinions des Français sur l’environnement et sur la forêt.” Collection des Rapports 174, Collection Etudes et Travaux 12, CREDOC, paris, 1996.

Duflos, C., G. Hatchuel, A.-D. Kowalski, and J.-P. Loisel. “Les Opinions Des Français sur la qualité Et Sur Les Risques Sanitaires Des Produits Alimentaires.” Rapport 190, CREDOC, Paris, 1998.

Eliasson, G. “International Competitiveness-An Empirical Analysis of Swedish Manufacturing.” Federation of Swedish Industries, *Mimeographed Series* B3 Stockholm (September, 1972).

Environmental Working Group's Farm Subsidy Database. Internet site: http://www.ewg.org:16080/farm/region.php?fips=00000 (Accessed September 30, 2006).

Fetherston, M., B. Moore, and J. Rhodes. "Manufacturing Export Shares and Cost Competitiveness of Advanced Industrial Countries." *Cambridge Economic Policy Review* 3 (1977):87-99.

Five Freedoms, Farm Animal Welfare Council. Internet site: http://www.fawc.org.uk/freedoms.htm (Accessed March 24, 2006).

Forney, J.C., N.J. Rabolt, and L. A. Friend. "Clothing Values and Country of Origin of Clothing: United States and New Zealand University Women." *Clothing and Textiles Research Journal* 12(Fall 1993):36-42.

Forsythe, S. et al. "Enhancing Demand Responsive Marketing In The U.S. Apparel Industry: Modeling Consumer Behavior In Global Markets." *National Textile Center Annual Report* (September, 1994): 57-66.

Fox, J., J. Shogren, D. Hayes, and J. Kleibenstein. "CVM-X: Calibrating Contingent Values with Experimental Auction Markets." *American Journal of Agricultural Economics* 80(August 1999):455-65.

French, S. and G. Rogers. "LOHAS Market Research Review: Marketplace Opportunities Abound." LOHAS Journal, 2005. Internet site: http://www.lohas.com/journal/trends.html (Accessed June 21, 2008)

Gaines, T.E. "Organic Wool Offers Unique Opportunities" Sheep Industry News, American Sheep Industry Association, January 2004. Internet site: http://www.ota.com/OrganicWool.html (Accessed January 26, 2006).

Gil, J. M.,A. Gracia, and M. Sanchez. "Market Segmentaion and Willingness to Pay for Organic Products in Spain." *International Food and Agribusiness Management Review* 3(2000):207-06.

Giraud, K.L., C.A. Bond, and J.J. Bond. "Consumer Preferences for Locally Made Specialty Food Products Across Northern New England" *Agricultural and Resource Economics Review* Oct 01, 2005 Internet site: http://www.backchannelmedia.com/newsletter/story/8894093758/Consumer_Preferences_for_Local.html (Accessed March 23, 2006).

Govindasamy, R., J. Italia , and D. Thatch. “Consumer Attitudes and Response Toward State-Sponsored Agricultural Promotion: An Evaluation of the Jersey Fresh Program.” Journal of Extension 37(June 1999): Internet site: http://www.joe.org/joe/1999june/rb2.html (Accessed March 27, 2006).

Green, W.H. 2003. *Econometric Analysis* (5th ed.). Upper Saddle River, N.J: Prentice Hall.

Grunert, S. “Everybody Seems Concerned About Environment: But Is This Concern Reflected in Danish Consumers’ Food Choice?” ACR Summer Conference, Amsterdam, The Nederlands, 1991.

Grunert, S. and H. Juhl. “Valuse, Environmental Attitudes, and Buying of Organic Foods.” *Journal of Economic Psychology* 16(1995):39-62.

Han, C.M. "Country Image: Halo or Summary Construct?" *Journal of Marketing Research* 26(May 1989):222-29.

Hanemann, M.W. and B. Kanninen. “The statistical analysis of discrete-response CV data.” Working Paper No. 798, Department of Agricultural and Resource Economics and Policy. Universtiy of Carlifornia, USA, 1998.

Harper, G.C. and A. Makatounin. “Consumer Perception of Organic Food Production and Farm Animal Welfare.” *British Food Journal* 104 (2002): 287-99.

Harrison, G.W.. “Experimental Evidence on Alternative Environmental Valuation Methods.” *Environmental and Resource Economics* 34(2006):125-62.

Hearne, R.R. and M.M. Volcan. 2002. “The Use of Choice Experiments to Analyze Consumer Preferences for Organic Produce in Costa Rica.” Paper presented at American Agricultural Economics Association (New Name 2008: Agricultural and Applied Economics Association) annual meeting, Long Beach, CA, 28-31 July.

Hensher, D.A., J. Rose, and W.H. Greene. “The Implications on Willingness to Pay of Respondents Ignoring Specific Attributes.” *Transportation* 32(Spring 2005):203-22.

Howard, P.H. and P. Allen. “Beyond Organic: Consumer Interest in New Labeling Schemes in the Central Coast of California.” International Journal of Consumer Studies 30 (September 2006):439-51.

Hustvedt, G. 2006. “Consumer preferences for blended organic cotton apparel” PhD Dissertation, Kansas State University.

Johansson, J.K. “Determinants and the Effects of the Use of ‘Made In’ Labels.” *International Marketing Review* 6(January 1989):47-58.

Kaldor, N. “The Effect of Devaluations on Trade in Manufactures.” *Further Essays on Applied Economics* London: Duckworth (1978): 99-118.

Kallas, Z., J.A. G´omez-Lim´on, and M. Arriaza. “Are Citizens willing to pay for agricultural multifunctionality?” *Agricultural Economics* 36(2007):405-419.

Kellman, M. “Relative Prices and International Competitiveness: An Empirical Investigation.” *Empirical Economics* 8 (1983):125-38.

Kim, H.S. and M.L. Damhorst. “Environmental Concern and Apparel Consumption.” *Clothing and Textiles Research Journal* 16 (1998):126-133.

Kimenju, S.C., U.B. Morawetz, and H. De Groote. “Comparing Contingent Valuation Method, Choice Experiments and Experimental Auctions in soliciting Consumer preference for maize in Western Kenya: Preliminary results.” Paper prepared for presentation at the African Econometric Society 10th Annual Conference on Econometric Modeling in Africa, Nairobi, Kenya, 6-8 July 2005.

Lewis, K.A. “Multimarket Demand Functions in the Presence of Supply Constraints: International Demand Functions for Cotton and Wool” *Southern Economic Journal* 38 (October, 1971):210-18.

List, J.A. “Do Explicit Warnings Eliminate the Hypothetical Bias in Elicitation Producers? Evidence from Field Auctions for Sportscars’” *American Economic Review* 91(2001):1498-1507.

Longworth, J.W, C.G. Brown, S.A. Waldron. 2005.*Modernizing China's Industries: Lessons from Wool And Wool Textiles.* Cheltenham, U.K. and Northampton, Mass.: Elgar.

Loomis, J., A. Gonzalez-Caban, and R. Gregory. “Do Reminders of Substitutes and Budget Constraints Influence Contingent Valuation Estimates?” *Land Economics* 70(November 1994):499-506.

Loureiro, M.L. and S. Hine. “Discovering Niche Markets: A Comparison of Consumer Willingness to Pay for A Local (Colorado-Grown), Organic, and GMO-free Product.” Selected Paper, 2001 American Agricultural Economics Association Meetings.

Loureiro, M.L., J.J. McCluskey, and R.C. Mittelhammer, “Are Stated Preferences Good Predictors of Market Behavior?” *Land Economics* 79 (February 2003):44-55.

Louviere, J.J., D.A. Hensher, and J.D. Swait. 2004. *Stated Choice Methods: Analysis and Application*. Cambridge , UK: Cambridge University Press, 2000.

Lusk, J.L. "Effects of Cheap Talk on Consumer Willingness-to-Pay for Golden Rice" *American Journal of Agricultural Economics* 85 (November 2003):840-56.

Lusk, J.L. "Effect of Experimental Design on Choice-Based Conjoint Valuation Estimates" *American Journal of Agricultural Economics* 85 (August 2005):771-85.

Lusk, J.L., J. Fox, T. Schroeder, J. Mintert, and M. Koohmaraie. "Will Consumers Pay for Guaranteed Tender Steak?" *Research Bulletin 3-99*, Research Institute on Livestock Pricing Agricultural and Applied Economics, Virginia Tech., Blacksburg, VA. 1999.

Lusk, J.L. and D. Hudson. "Willingness-to-Pay Estimates and Their Relevance to Agribusiness Decision Making." *Review of Agricultural Economics* 26 (June 2004):152-69.

MacDonald, S. and T. Vollrath. 2005. *The Forces Shaping World Cotton Consumption after the Multifiber Arrangement.* Washington DC: United States Department of Agriculture, Economic Research Service. April.

Makatouni, A. "What Motivates Consumers to Buy Organic Food in The UK?" *British Food Journal* 104 (2002):345-52.

Mceachern, M.G. and M.J.A. Schroder. "The Role of Livestock Production Ethics in Consumer Values Towards Meat." Journal of Agricultural and Environmental Ethics 15 (2002):221-237.

McInerney, J.P. "The Economics of Welfare." (1998):115-32 in *Ethics, Welfare, Law and Market Forces: The Veterinary Inference*. A.R. Michell, and R. Ewbank, ed. Univ. Fed. For Anim. Welfare, Wheathampstead, U.K.

Miller, M. "Organic Lamb Profile." Agricultural Marketing Resource Center, August 2005. Internet site: http://www.agmrc.org/agmrc/commodity/livestock/lamb/organiclambprofile.htm (Accessed January 18, 2006).

Mitchell, R.C. and R.T. Carson. 1989. *Using Surveys to Value Public Goods: The Contingent Valuation Method.* Baltimore: Johns Hopkins University Press for Resources for the Future.

Moynagh, J. "EU Regulation and Consumer Demand For Animal Welfare." *AgBioForum* 3(2000):107-14.

Napolitano, F. et al. “Effect of Information About Animal Welfare on Consumer Willingness to Pay for Yogurt.” *Journal of Dairy Science* 91 (2008):910-917.

National Agricultural Statistic Service, United States Department of Agriculture. Internet site: http://www.nass.usda.gov/index.asp (Accessed April 9, 2006)

Neill, H.R., R.G. Cummings, P. Ganderton, G.W. Harrison, and T. McGuckin. “Hypothetical Surveys and Real Economic Commitments.” *Land Economics* 70 (May 1994):145-54.

Nerlove, M. and S.J. Press. 1973. *Univariate and Multivariate Log-linear and Logistic Models*. Santa Monica: Calif., Rand Corp.

Neuhauser, C.A., and M.A. Morganosky. “Schematic Information Processing of Country of Origin Cues in Catalogs.” *Clothing and Textiles Research Journal* 12 (Summer 1994):31-36.

New Zealand Ministry of Agriculture and Forestry. “New Zealand Sheep Industry.” Wellington, NZ. 2001. Internet site: http://www.maf.govt.nz

New Zealand Ministry of Agriculture and Forestry. “Sheep numbers, wool production and exports set for further decline” Media Release, December, 2002. Internet site: http://www.maf.govt.nz/mafnet/press/181202sonzaf-wool.htm (Accessed January 26, 2006).

Nimon, W and J. Beghin. ” Are eco-labels valuable? Evidence from the apparel industry.” *American Journal of Agricultural Economics* 81 (November 1999):801-811.

Onozaka, Y., D.S. Bunch, and D.M. Larson. 2006. “What Exactly Are They Paying For? Decomposing The Price Premium For Organic Fresh Produce of Heterogeneous Consumers.” Working paper, Department of Agricultural & Resource Economics, University of California, Davis.

Osborne, L., and V.K. Smith. “Environmental Amenities, Product Differentiation, and Market Power.” Mimeo, 1997.

Organic Trade Association. “2004 OTA Manufacturer Survey Overview.” Internet site: http://www.ota.com/organic/mt.html (Accessed March 01, 2006).

Organic Trade Association. “Organic Cotton Facts.” 2006. Internet site: http://www.ota.com/organic/mt/organic_cotton.html (Accessed March 01, 2006).

Organic Trade Association. “Organic Wool Fact Sheet.” 2005. Internet site: http://www.ota.com/organic/woolfactsheet.html (Accessed January 26, 2006).

Organic woolens. Internet site: http://www.graigfarm.co.uk/wool.htm (Accessed January 24, 2006).

Ozanne, L.K. and R.P. Vlosky. "Willingness to pay for environmentally certified wood products." *Forest Products Journal* (1997):39-48.

Papadopulos, N.G. and L.A. Heslop. "Product-Country Images: Impact and Role in International Marketing." *New York and London: International Business Press* (1993):3-38.

Paradiso, M., and T. Antonella. "The Effect of Knowledge on the Disparity between Hypothetical and Real Willingness to Pay." *Applied Economics* 33(September 2001):1359-64.

Patterson, P.M., H. Olofsson, T.J. Richards, and S. Sass. "Arizona Grown." National Food and Agricultural Policy Project Newsletter, August 1997. Internet site: http://www.eas.asu.edu/~nfapp/html/aug97.htm#a1 (Accessed March 27, 2006).

Pecher, A. and A. Tregear. "Product Country Image Effects for Food Products: The Case of German Cheese in the UK." *Journal of International Food and Agribusiness Marketing* 11(2000c):1-15.

Peterson, H.H. and G. Hustvedt. "Consumer Demand for U.S. Organic Wool." Working project, Kansas State University.

Peterson, H.H. and K. Yoshida. "Quality Perceptions and Willingness-to-Pay for Imported Rice in Japan." *Journal of Agricultural and Applied Economics* 36(April 2004):123-41.

Porat, A. "Mexico: A Country on Its Way to World-Class Standing." *Directors & Boards* 17 (1993):39-42.

Roberts, J.A. "Will the real socially responsible consumer please step forward?" *Business Horizons* 39 (January 1996):79-83.

Robert-Kréziak, D. "Les Motivations De La Consummation Verte: Une Approche Par Les Chaînages Cognitifs." Thèse De Doctorat En Sciences De Gestion, Université De Grenoble, 1998.

Roth, M.S. and J.B. Romeo. "Matching Product Category and Country Image Perceptions: A Framework for Managing Country-of-Origin Effects." *Journal of International Business Studies* 23(1992c):477-97.

Russell, C.S., S. Krarup, and C.D. Clark. “Environment, Information and Consumer Behaviour: An Introduction.” In C.S. Russell and Krarup, ed. *Environment, Information and consumer Behaviour*. Edward Elgar , Cheltenham, UK (2005): 1-29.

Samuelson, R. K. Wool Marketing Director, American Wool Council, American Sheep Industry Association, 2006.

Savage, B. International Marketing Consultant, American Sheep Industry Association, 2006.

SaveTheSheep.com. “Boycott Australian Wool.” Internet site: http://www.savethesheep.com/f-boycottAuWool.asp (Accessed April 2, 2006).

SaveTheSheep.com. “PETA Sets the Record Straight Amid a Barrage of Misinformation and Lies.” Internet site: http://www.savethesheep.com/f-setstraight.asp (Accessed April 2, 2006).

SaveTheSheep.com. “FAQ.” Internet site: http://www.savethesheep.com/faq.asp#top (Accessed September 23, 2006).

Scientific Committee on Animal Health and Animal Welfare. “The Welfare of Chickens Kept for Meat Production (Broilers).” 2000. Internet site: http://europa.eu.int/comm/food/fs/sc/scah/out39_en.pdf (Accessed March 22, 2006).

Sheep and Goats, NASS, USDA. Internet site: http://usda.mannlib.cornell.edu/reports/nassr/livestock/pgg-bb/shep0106.txt (Accessed July 12, 2006).

Sirieix, L. and Schaer B. “A Cross-Cultural Research on Consumers Attitudes and Behaviors Towards Organic and Local Foods.” 1999. Internet site: http://marketing.byu.edu/htmlpages/ccrs/proceedings99/sirieixschaer.htm (Accessed March 22, 2006).

Soil Association Certification Limited. Internet site: http://www.soilassociation.org/web/sacert/sacertweb.nsf/B3/textiles.html (Accessed January 24, 2006).

Speer, J.K. “Shearing the Edge of Innovation.” Apparel Magazine. (May 01, 2006).

Stroup, R.L. “Political Behavior.” Internet site: http://www.econlib.org/LIBRARY/Enc/PoliticalBehavior.html (Accessed September 29, 2006).

Summary and Evolution of U. S. Farm Bill Commodity Titles, The National Agricultural Law Center. Internet site: http://www.nationalaglawcenter.org/assets/farmbills/commodity.html (Accessed October 04, 2006).

Teisl, M.F., B. Roe, and R.L. Hicks. "Can Eco-Labels Tune a Market? Evidence From Dolphin-Safe Labeling." *Journal of Environmental Economics and Management* 43(2002): 339-59.

Teisl, M.F. and B. Roe. "Evaluating the Factors That Impact the Effectiveness of Eco-Labeling Program." In C.S. Russell and Krarup, ed. *Environment, Information and consumer Behaviour*. Edward Elgar , Cheltenham, UK (2005): 65-90.

Textile Consumer, Cotton Incorporated. Internet site: http://www.cottoninc.com/TextileConsumer/ (Accessed July 24, 2006)

The American Textile Manufacturers Institute. *The China Threat to World Textile and Apparel Trade*, 2003. Washington DC.

The National List of Allowed and Prohibited Substances, The National Organic Program, Agricultural Marketing Service, United States Department of Agriculture. Internet site: http://www.ams.usda.gov/nop/NationalList/FinalRule.html Accessed October 5, 2006)

The Wool Industry, Australian Bureau of Statistics. Internet site: http://www.abs.gov.au/ausstats/abs@.nsf/0/F7B136618913C740CA256B35007C2065?Open (Accessed July 13, 2006).

Thurstone, L.L. "A Law of Comparative Judgment." *Psychological Review* 34 (July 1927):273-286.

Tonsor, G.T., T.C. Schroeder, J.A. Fox, and A. Biere. "European Preferences for Beef Steak Attributes." *Journal of Agricultural and Resource Economics* 30(August 2005):367-80.

Umberger, W.J., D.M. Feuz, C.R. Calkins and Karen M. Killinger. "Consumer Preference and Willingness-to-pay for Flavor in Beef Steaks." Paper presented at IAMA annual meeting, Chicago, IL, 2000.

U.S. Bureau of the Census. Internet site: http://www.census.gov/ (Accessed May 24, 2006).

U.S. Environmental Protection Agency. "Determinants of Effectiveness of Environmental Certification and Labeling Programs." Office of Pollution Prevention and Toxics, Washington, DC. (1994).

Wachenheim, C.J. and T. VanWechel. “The Influence of Environmental-Impact Information on Consumer Willingness to Pay for Products Labeled as Free of Genetically Modified Ingredients.” *Journal of Food Distribution Research* 35 (2004):1-13.

Wedel, J. “Organic Farming: Feast or Famine?” Presentation at Organic Agriculture: Opportunities for Family Farms, Manhattan, KS, February 18-19, 2005. Internet site: http://www.kansassustainableag.org/organic/presentations.htm (Accessed January 26, 2006).

Why organic wool? Internet site: http://organicwoollies.co.uk/organic.html (Accessed January 24, 2006).

Wool Harvesting with BIOCLIP™. Internet site: http://www.questacon.edu.au/temp_japan/story.asp?tblStories.storyNumber=17&languageID=AU&categoryID=PA (Accessed September 7, 2006).

Wool Profile, Agricultural Marketing Resource Center. Internet site: http://www.agmrc.org/agmrc/commodity/livestock/lamb/woolprofile.htm (Accessed July 19, 2006).

Appendix A - The National List of Allowed and Prohibited Substances in Organic Practices

§ 205.600 Evaluation criteria for allowed and prohibited substances, methods, and ingredients.

The following criteria will be utilized in the evaluation of substances or ingredients for the organic production and handling sections of the National List:

(a) Synthetic and nonsynthetic substances considered for inclusion on or deletion from the National List of allowed and prohibited substances will be evaluated using the criteria specified in the Act (7 U.S.C. 6517 and 6518).

(b) In addition to the criteria set forth in the Act, any synthetic substance used as a processing aid or adjuvant will be evaluated against the following criteria:

(1) The substance cannot be produced from a natural source and there are no organic substitutes;

(2) The substance's manufacture, use, and disposal do not have adverse effects on the environment and are done in a manner compatible with organic handling;

(3) The nutritional quality of the food is maintained when the substance is used, and the substance, itself, or its breakdown products do not have an adverse effect on human health as defined by applicable Federal regulations;

(4) The substance's primary use is not as a preservative or to recreate or improve flavors, colors, textures, or nutritive value lost during processing, except where the replacement of nutrients is required by law;

(5) The substance is listed as generally recognized as safe (GRAS) by Food and Drug Administration (FDA) when used in accordance with FDA's good manufacturing practices (GMP) and contains no residues of heavy metals or other contaminants in excess of tolerances set by FDA; and

(6) The substance is essential for the handling of organically produced agricultural products.

(c) Nonsynthetics used in organic processing will be evaluated using the criteria specified in the Act (7 U.S.C. 6517 and 6518).

§ 205.601 Synthetic substances allowed for use in organic crop production.

In accordance with restrictions specified in this section, the following synthetic substances may be used in organic crop production:

(a) As algicide, disinfectants, and sanitizer, including irrigation system cleaning systems

(1) Alcohols

(i) Ethanol

(ii) Isopropanol

(2) Chlorine materials - Except, That, residual chlorine levels in the water shall not exceed the maximum residual disinfectant limit under the Safe Drinking Water Act.

(i) Calcium hypochlorite

(ii) Chlorine dioxide

(iii) Sodium hypochlorite

(3) Hydrogen peroxide

(4) Soap-based algicide/demisters

(b) As herbicides, weed barriers, as applicable.

(1) Herbicides, soap-based - for use in farmstead maintenance (roadways, ditches, right of ways, building perimeters) and ornamental crops

(2) Mulches

(i) Newspaper or other recycled paper, without glossy or colored inks.

(ii) Plastic mulch and covers (petroleum-based other than polyvinyl chloride (PVC))

(c) As compost feedstocks

Newspapers or other recycled paper, without glossy or colored inks

(d) As animal repellents

Soaps, ammonium - for use as a large animal repellant only, no contact with soil or edible portion of crop

(e) As insecticides (including acaricides or mite control)

(1) Ammonium carbonate - for use as bait in insect traps only, no direct contact with crop or soil

(2) Boric acid - structural pest control, no direct contact with organic food or crops

(3) Elemental sulfur

(4) Lime sulfur - including calcium polysulfide

(5) Oils, horticultural - narrow range oils as dormant, suffocating, and summer oils.

(6) Soaps, insecticidal

(7) Sticky traps/barriers

(f) As insect attractants

Pheromones

(g) As rodenticides

(1) Sulfur dioxide - underground rodent control only (smoke bombs)

(2) Vitamin D3

(h) As slug or snail bait

<None>

(i) As plant disease control

(1) Coppers, fixed - copper hydroxide, copper oxide, copper oxychloride, includes products exempted from EPA tolerance, Provided, That, copper-based materials must be used in a manner that minimizes accumulation in the soil and shall not be used as herbicides.

(2) Copper sulfate - Substance must be used in a manner that minimizes accumulation of copper in the soil.

(3) Hydrated lime - must be used in a manner that minimizes copper accumulation in the soil.

(4) Hydrogen peroxide

(5) Lime sulfur

(6) Oils, horticultural, narrow range oils as dormant, suffocating, and summer oils.

(7) Potassium bicarbonate

(8) Elemental sulfur

(9) Streptomycin, for fire blight control in apples and pears only

(10) Tetracycline (oxytetracycline calcium complex), for fire blight control only

(j) As plant or soil amendments.

(1) Aquatic plant extracts (other than hydrolyzed) - Extraction process is limited to the use of potassium hydroxide or sodium hydroxide; solvent amount used is limited to that amount necessary for extraction.

(2) Elemental sulfur

(3) Humic acids - naturally occurring deposits, water and alkali extracts only

(4) Lignin sulfonate - chelating agent, dust suppressant, floatation agent

(5) Magnesium sulfate - allowed with a documented soil deficiency

(6) Micronutrients - not to be used as a defoliant, herbicide, or desiccant. Those made from nitrates or chlorides are not allowed. Soil deficiency must be documented by testing.

(i) Soluble boron products

(ii) Sulfates, carbonates, oxides, or silicates of zinc, copper, iron, manganese, molybdenum, selenium, and cobalt,

(7) Liquid fish products - can be pH adjusted with sulfuric, citric or phosphoric acid. The amount of acid used shall not exceed the minimum needed to lower the pH to 3.5

(8) Vitamins, B1, C, and E

(k) As plant growth regulators

Ethylene - for regulation of pineapple flowering

(l) As floating agents in postharvest handling

(1) Lignin sulfonate

(2) Sodium silicate - for tree fruit and fiber processing

(m) As synthetic inert ingredients as classified by the Environmental Protection Agency (EPA), for use with nonsynthetic substances or synthetic substances listed in this section and used as an active pesticide ingredient in accordance with any limitations on the use of such substances.

(1) EPA List 4 - Inerts of Minimal Concern

(n)-(z) [Reserved]

§ 205.602 Nonsynthetic substances prohibited for use in organic crop production.

The following nonsynthetic substances may not be used in organic crop production:

(a) Ash from manure burning

(b) Arsenic

(c) Lead salts

(d) Sodium fluoaluminate (mined)

(e) Strychnine

(f) Tobacco dust (nicotine sulfate)

(g) Potassium chloride - unless derived from a mined source and applied in a manner that minimizes chloride accumulation in the soil.

(h) Sodium nitrate - unless use is restricted to no more than 20% of the crop's total nitrogen requirement.

(i)-(z) [Reserved]

§ 205.603 Synthetic substances allowed for use in organic livestock production.

In accordance with restrictions specified in this section the following synthetic substances may be used in organic livestock production:

(a) As disinfectants, sanitizer, and medical treatments as applicable

(1) Alcohols

(i) Ethanol - disinfectant and sanitizer only, prohibited as a feed additive

(ii) Isopropanol - disinfectant only

(2) Aspirin - approved for health care use to reduce inflammation

(3) Chlorine materials - disinfecting and sanitizing facilities and equipment. Residual chlorine levels in the water shall not exceed the maximum residual disinfectant limit under the Safe Drinking Water Act

(i) Calcium hypochlorite

(ii) Chlorine dioxide

(iii) Sodium hypochlorite

(4) Chlorohexidine - Allowed for surgical procedures conducted by a veterinarian. Allowed for use as a teat dip when alternative germicidal agents and/or physical barriers have lost their effectiveness

(5) Electrolytes - without antibiotics

(6) Glucose

(7) Glycerin - Allowed as a livestock teat dip, must be produced through the hydrolysis of fats or oils

(8) Iodine

(9) Hydrogen peroxide

(10) Magnesium sulfate

(11) Oxytocin - use in postparturition therapeutic applications

(12) Parasiticides

Ivermectin - prohibited in slaughter stock, allowed in emergency treatment for dairy and breeder stock when organic system plan-approved preventive management does not prevent infestation. Milk or milk products from a treated animal cannot be labeled as provided for in subpart D of this part for 90 days following treatment. In breeder stock, treatment cannot occur during the last third of gestation if the progeny will be sold as organic and must not be used during the lactation period of breeding stock. (13) Phosphoric acid - allowed as an equipment cleaner, Provided, That, no direct contact with organically managed livestock or land occurs.

(14) Biologics

Vaccines

(b) As topical treatment, external parasiticide or local anesthetic as applicable.

(1) Iodine

(2) Lidocaine - as a local anesthetic. Use requires a withdrawal period of 90 days after administering to livestock intended for slaughter and 7 days after administering to dairy animals

(3) Lime, hydrated - (bordeaux mixes), not permitted to cauterize physical alterations or deodorize animal wastes.

(4) Mineral oil - for topical use and as a lubricant

(5) Procaine - as a local anesthetic, use requires a withdrawal period of 90 days after administering to livestock intended for slaughter and 7 days after administering to dairy animals

(6) Copper sulfate

(c) As feed supplements

Milk replacers - without antibiotics, as emergency use only, no nonmilk products or products from BST treated animals

(d) As feed additives

(1) Trace minerals, used for enrichment or fortification when FDA approved, including:

(i) Copper sulfate

(ii) Magnesium sulfate

(2) Vitamins, used for enrichment or fortification when FDA approved

(e) As synthetic inert ingredients as classified by the Environmental Protection Agency (EPA), for use with nonsynthetic substances or a synthetic substances listed in this section and used as an active pesticide ingredient in accordance with any limitations on the use of such substances.

EPA List 4 - Inerts of Minimal Concern.

(f)-(z) [Reserved]

§ 205.604 Nonsynthetic substances prohibited for use in organic livestock production.

The following nonsynthetic substances may not be used in organic livestock production:

(a) Strychnine

(b)-(z) [Reserved]

§ 205.605 Nonagricultural (nonorganic) substances allowed as ingredients in or on processed products labeled as "organic" or "made with organic (specified ingredients or food group(s))."

The following nonagricultural substances may be used as ingredients in or on processed products labeled as "organic" or "made with organic (specified ingredients or food group(s))" only in accordance with any restrictions specified in this section.

(a) Nonsynthetics allowed:

(1) Acids

(i) Alginic

(ii) Citric - produced by microbial fermentation of carbohydrate substances

(iii) Lactic

(2) Bentonite

(3) Calcium carbonate

(4) Calcium chloride

(5) Colors, nonsynthetic sources only

(6) Dairy cultures

(7) Diatomaceous earth - food filtering aid only

(8) Enzymes - must be derived from edible, nontoxic plants, nonpathogenic fungi, or nonpathogenic bacteria

(9) Flavors, nonsynthetic sources only and must not be produced using synthetic solvents and carrier systems or any artificial preservative.

(10) Kaolin

(11) Magnesium sulfate, nonsynthetic sources only

(12) Nitrogen - oil-free grades

(13) Oxygen - oil-free grades

(14) Perlite - for use only as a filter aid in food processing

(15) Potassium chloride

(16) Potassium iodide

(17) Sodium bicarbonate

(18) Sodium carbonate

(19) Waxes - nonsynthetic

(i) Carnauba wax

(ii) Wood resin

(20) Yeast - nonsynthetic, growth on petrochemical substrate and sulfite waste liquor is prohibited

(i) Autolysate

(ii) Bakers

(iii) Brewers

(iv) Nutritional

(v) Smoked - nonsynthetic smoke flavoring process must be documented.

(b) Synthetics allowed:

(1) Alginates

(2) Ammonium bicarbonate - for use only as a leavening agent

(3) Ammonium carbonate - for use only as a leavening agent

(4) Ascorbic acid

(5) Calcium citrate

(6) Calcium hydroxide

(7) Calcium phosphates (monobasic, dibasic, and tribasic)

(8) Carbon dioxide

(9) Chlorine materials - disinfecting and sanitizing food contact surfaces, Except, That, residual chlorine levels in the water shall not exceed the maximum residual disinfectant limit under the Safe Drinking Water Act.

(i) Calcium hypochlorite

(ii) Chlorine dioxide

(iii) Sodium hypochlorite

(10) Ethylene - allowed for postharvest ripening of tropical fruit

(11) Ferrous sulfate - for iron enrichment or fortification of foods when required by regulation or recommended (independent organization)

(12) Glycerides (mono and di) - for use only in drum drying of food

(13) Glycerin - produced by hydrolysis of fats and oils

(14) Hydrogen peroxide

(15) Lecithin - bleached

(16) Magnesium carbonate - for use only in agricultural products labeled "made with organic (specified ingredients or food group(s))," prohibited in agricultural products labeled "organic"

(17) Magnesium chloride - derived from sea water

(18) Magnesium stearate - for use only in agricultural products labeled "made with organic (specified ingredients or food group(s))," prohibited in agricultural products labeled "organic"

(19) Nutrient vitamins and minerals, in accordance with 21 CFR 104.20, Nutritional Quality Guidelines For Foods

(20) Ozone

(21) Pectin (low-methoxy)

(22) Phosphoric acid - cleaning of food-contact surfaces and equipment only

(23) Potassium acid tartrate

(24) Potassium tartrate made from tartaric acid

(25) Potassium carbonate

(26) Potassium citrate

(27) Potassium hydroxide - prohibited for use in lye peeling of fruits and vegetables

(28) Potassium iodide - for use only in agricultural products labeled "made with organic (specified ingredients or food group(s))," prohibited in agricultural products labeled "organic"

(29) Potassium phosphate - for use only in agricultural products labeled "made with organic (specific ingredients or food group(s))," prohibited in agricultural products labeled "organic"

(30) Silicon dioxide

(31) Sodium citrate

(32) Sodium hydroxide - prohibited for use in lye peeling of fruits and vegetables

(33) Sodium phosphates - for use only in dairy foods

(34) Sulfur dioxide - for use only in wine labeled "made with organic grapes," Provided, That, total sulfite concentration does not exceed 100 ppm.

(35) Tocopherols - derived from vegetable oil when rosemary extracts are not a suitable alternative

(36) Xanthan gum

(c)-(z) [Reserved]

§ 205.606 Nonorganically produced agricultural products allowed as ingredients in or on processed products labeled as organic or made with organic ingredients.

The following nonorganically produced agricultural products may be used as ingredients in or on processed products labeled as "organic" or "made with organic (specified ingredients or food group(s))" only in accordance with any restrictions specified in this section.

Any nonorganically produced agricultural product may be used in accordance with the restrictions specified in this section and when the product is not commercially available in organic form.

(a) Cornstarch (native)

(b) Gums - water extracted only (arabic, guar, locust bean, carob bean)

(c) Kelp - for use only as a thickener and dietary supplement

(d) Lecithin - unbleached

(e) Pectin (high-methoxy)

Source: The National List of Allowed and Prohibited Substances, The National Organic Program, Agricultural Marketing Service, United States Department of Agriculture

Appendix B - Survey

Survey on Apparels

Q1. How often do you shop for apparel products (circle all that apply)?

	Once a week	Every 2 weeks	Once a month	Every 2 months	When there is a sale	Special occasions (e.g. birthdays, holidays)	Don't know
For yourself	1	2	3	4	5	6	7
For family	1	2	3	4	5	6	7
For friends	1	2	3	4	5	6	7

Q2. How often do you check the following information on labels when shopping for apparel products (circle one in each row)?

	Never	Rarely	Sometimes	Often	Always	Don't know
Fiber content	1	2	3	4	5	6
Country of origin	1	2	3	4	5	6
Care instructions	1	2	3	4	5	6

Q3. Where do you usually shop for apparel products (circle all that apply)?

	Department store	Brand specialty store	Internet	Retailer store (e.g. Wal-mart or Target)	Catalogs, Mail orders	Other
For yourself	1	2	3	4	5	6
For family	1	2	3	4	5	6
For friends	1	2	3	4	5	6

Q4. If you received a bonus that equaled 10% of your monthly income, what share of it would you spend on apparel (circle one)?

Less than 10%	10 to less than 30%	30 to less than 50%	50 to less than 70%	70 to less than 90%	More than 90%	Don't know
1	2	3	4	5	6	7

Q5. How important to you are the following attributes (A~K) of apparel items made from natural fiber (such as wool, silk, and cotton) if products come in color and style of your liking (circle one in each row)?

		Not at all important	Slightly important	Moderately important	Very important	Don't know
A	Machine washable	1	2	3	4	5
B	Wrinkle-free	1	2	3	4	5
C	Shrink resistant	1	2	3	4	5
D	Durability	1	2	3	4	5
E	Certified organic	1	2	3	4	5

F	Animal-friendly	1	2	3	4	5
G	Environment-friendly	1	2	3	4	5
H	Country of origin of fiber (e.g. made from US cotton)	1	2	3	4	5
I	Country of origin of apparel (e.g. assembled and sewn in USA)	1	2	3	4	5
J	Price	1	2	3	4	5
K	Designer/store brand	1	2	3	4	5

Q6. Following Question 5, please tell us which two among the attributes A to K are the *most* important and the *least* important attributes to you?

The most important: _____ and _____

The least important: _____ and _____

Q7. What kind of wool products do you currently own (circle all that apply)?

Outer-wear	Sweater	Dress suit/ Jacket	Scarf	Gloves	Hat	Socks	Blanket	Other	Don't know
1	2	3	4	5	6	7	8	9	10

If you answered "other", please specify:

Q8. If you were to purchase a new wool product, which product you would be interested in purchasing (circle all that apply)?

Outer-wear	Sweater	Dress suit/ Jacket	Scarf	Gloves	Hat	Socks	Blanket	Other	Don't know
1	2	3	4	5	6	7	8	9	10

If you answered "other", please specify:

Q9. How often do you purchase organic versions of the following products (circle one in each row)?

	Never	Less than 10% of the time	10 to 40% of the time	40 to 60% of the time	60 to 90% of the time	More than 90% of the time
Fruits	1	2	3	4	5	6
Vegetables	1	2	3	4	5	6
Meat	1	2	3	4	5	6
Dairy products	1	2	3	4	5	6
Apparel	1	2	3	4	5	6
Bath & bedding	1	2	3	4	5	6
Skin care	1	2	3	4	5	6

Q10. Please indicate your familiarity with the following items (circle one in each row).

	Never heard about it	Heard about it, but don't know what it is	Moderately familiar with its attributes	Very familiar with its attributes
Organic food	1	2	3	4
Cotton marketed as organic	1	2	3	4
Wool marketed as organic	1	2	3	4

Q11. In your opinion, how much environmental damage is caused by each of the following activities (circle one)?

	No damage	Slight damage	Moderate damage	Much damage
Growing cotton	1	2	3	4
Manufacturing polyester	1	2	3	4
Manufacturing rayon fiber	1	2	3	4
Dyeing cotton fabric	1	2	3	4
Dyeing polyester fabric	1	2	3	4

Q12. Do you believe in animal rights, that animals are capable of suffering and have an interest in leading their own lives (circle one)?

Not at all	Slightly	Partly	Mostly	Definitely	Don't know
1	2	3	4	5	6

Q13. How often do you recycle (circle one)?

Never	Rarely	Sometimes	Often	Always
1	2	3	4	5

Q14. If the same food products of different origin were available for purchase, how often would you choose the U.S. grown product over products from other countries (circle one)?

Never	Rarely	Sometimes	Often	Always
1	2	3	4	5

Q15. How often do you shop or eat at local, independent businesses, compared to nationally and regionally franchised businesses (circle one)?

Never	Less than 15% of the time	15 to 50% of the time	50 to 85% of the time	More than 85% of the time
1	2	3	4	5

Q16. When you hear of a new restaurant opening in your neighborhood, how likely would you try it within the first week of its opening (circle one)?

Less than 10% of the time	10 to 40% of the time	40 to 60% of the time	60 to 90% of the time	More than 90% of the time
1	2	3	4	5

Q17. New breeds of merino sheep can produce super-fine wool that is extremely comfortable to wear. Super-fine wool does not itch and is light enough to wear year round. Many people who are allergic to wool report that, unlike other wool, super-fine wool does not give them the same skin reactions, like rashes or redness.

Suppose you go into a store where you usually purchase apparel and accessories to purchase a pair of knitted gloves, and you find 3 pairs of knitted

gloves made from super-fine wool, labeled for various attributes, and 1 pair of knitted gloves made from acrylic. Here are the definitions of various labels :

Labels:	Descriptions:
US Wool	**S**uper-fine wool from sheep that were raised and shorn in U.S.
AU Wool	**S**uper-fine wool from sheep that were raised and shorn in Australia.
Organic	**W**ool that was produced and processed into yarn according to the National Organic Standards regulated by the US Department of Agriculture.
Pro-Animal	**W**ool that was shorn with care from sheep that were treated humanely, with respect for their physical and mental wellness.
Pro-Environment	**W**ool that was produced and processed using methods with minimum impact on the environment, which may be more or less stringent than the organic standards.

These labels may imply a few things such as the following:

Organic farming and manufacturing practices limit the use of synthetic substances to those approved by the National Organic Standards. Besides the organic standards, there are other ways to produce wool that can be considered pro-environment. Producers who find it challenging to adhere to the organic standards can adopt less stringent production practices and still claim that their products are pro-environment.

When people who raise sheep organically treat the sheep for worms using anti-parasite drugs, the wool from the sheep is no longer considered organic under current standards. Since worms are common, this makes it difficult to produce organic wool. Some people believe that failing to give the sheep the most effective treatment for worms is cruel to the sheep.

Country-of-origin tells us where the fiber production is taking place. If an organic or pro-environment production process is being used, the country-of-origin tells us which environment is directly benefiting from such production practices. Moreover, some people are concerned about the environmental impact of transporting products over long distances.

Mulesing is an important part of husbandry in Australia, where the skin around the backside is surgically removed to prevent fly strike caused by Australian blowfly. The process of mulesing has been reported to mutilate many sheep by trussing the animals upside-down and carving large pieces of flesh from their rumps without any pain relief medication.

Assuming the following gloves are available in your favorite color and design, please circle one pair that you would purchase for each question Q17-1 through Q17-6.

Q17-1. (circle one)

Product A	**Product B**	**Product C**	**Product D**
AU wool	US wool	US wool	
Organic	Pro-Animal	Organic	Acrylic
Pro-Animal	Pro-Environment	Pro-Environment	
$8.25	$7.50	$8.70	$6.75
1	2	3	4

Q17-2. (circle one)

Product A	Product B	Product C	Product D
US wool	AU wool	AU wool	
Organic	Organic	Pro-Animal	Acrylic
Pro-Animal	Pro-Environment	Pro-Environment	
$7.50	$8.25	$8.70	$6.75
1	2	3	4

Q17-3. (circle one)

Product A	Product B	Product C	Product D
AU wool	US wool	US wool	
Organic	Pro-Animal	Organic	Acrylic
Pro-Environment	Pro-Environment	Pro-Animal	
$7.50	$8.70	$8.25	$6.75
1	2	3	4

Q17-4. (circle one)

Product A	Product B	Product C	Product D
US wool	US wool	AU wool	
Organic	Organic	Pro-Animal	Acrylic
Pro-Environment	Pro-Animal	Pro-Environment	
$8.70	$7.50	$8.25	$6.75
1	2	3	4

Q17-5. (circle one)

Product A	Product B	Product C	Product D
AU wool	AU wool	US wool	
Pro-Animal	Organic	Organic	Acrylic
Pro-Environment	Pro-Animal	Pro-Environment	
$7.50	$8.70	$8.25	$6.75
1	2	3	4

Q17-6. (circle one)

Product A	Product B	Product C	Product D
US wool	AU wool	AU wool	
Pro-Animal	Organic	Organic	Acrylic
Pro-Environment	Pro-Environment	Pro-Animal	
$8.25	$7.50	$8.70	$6.75
1	2	3	4

The remaining questions provide valuable demographic information for analyzing your responses. Your responses are completely anonymous, so please answer all questions. Thank you!

Q18. Zip code: | | | | | |

Q19. Gender (circle one):

Male	Female
1	2

Q20. Marital status (circle one):

Single	Married	Separated	Widowed	Divorced
1	2	3	4	5

Q21. Your age (circle one):

Under 24	25 - 44	45 - 59	60 - 84	85 years and over
1	2	3	4	5

Q22. Your race (circle all that apply):

White	Black/ African American	Hispanic	American Indian/Alaska Native	Asian	Native Hawaiian/ Pacific Islander	Other
1	2	3	4	5	6	7

If you answered "other", please specify:

Q23. How many of your household members are in the following age groups (enter the number of household members below each age group)?

0 - 3	4 -18	19- 22	23 - 30	31 - 60	61 - 80	More than 80

Q24. The highest education level that you have completed (circle one):

Elementary school	High school or equivalent	2-year college	4-year college	Graduate school
1	2	3	4	5

Q25. Are members of your household, including yourself, allergic to the following (circle all that apply)?

Food	Pollen	Dust	Pet	Fiber	Chemical	Other	None
1	2	3	4	5	6	7	8

If you answered "other", please specify:

Q26. Do you currently have a pet at home (circle all that apply)?

Dog	Cat	Fish	Bird	Amphibian	Other	None
1	2	3	4	5	6	7
If you answered "other", please specify:						

Q27. Your annual household income before tax (circle one):

Less than $14,999	Between $15,000 ~ $24,999	Between $25,000 ~ $34,999	Between $35,000 ~ $74,999	Between $75,000 ~ $99,999	Between $100,000 ~ $149,999	More than $150, 000
1	2	3	4	5	6	7

Thank you very much for spending your time to complete this survey. Please feel free to leave us your comments, opinions, or questions about apparel or textile production.

_____

_____

_____

_____

_____

_____

Appendix C - Tables of Estimated Marginal Effects of Multinomial Logit Model Using Disaggregated Samples

Estimated Marginal Effects of Multinomial Logit Model, Version A_Mail

	Pr(COO-focused)	Pr(Animal - focused)	Pr(Environment-focused)	Pr(Acrylic)	Pr(Cheapest Wool)
Constant	0.3230	0.4219	-0.1414	0.4219	0.3230
	(0.3865)	(0.4319)	(0.2696)	(0.4319)	(0.3865)
FEMALE	0.0381	0.0124	0.0327	-0.1112 *	0.0280
	(0.0799)	(0.0873)	(0.0549)	(0.0594)	(0.0424)
AGE	-0.0708	-0.0118	0.0468	-0.0118	-0.0708
	(0.0488)	(0.0545)	(0.0352)	(0.0545)	(0.0488)
EDUC	-0.1251 ***	0.0536	0.0216	0.0536	-0.1251 ***
	(0.0350)	(0.0391)	(0.0241)	(0.0391)	(0.0350)
ALLERGY	-0.1456 *	0.0931	0.0490	0.0572	-0.0537
	(0.0792)	(0.0843)	(0.0501)	(0.0540)	(0.0432)
PET	-0.0286	0.0468	0.0173	-0.0458	0.0104
	(0.0831)	(0.0910)	(0.0553)	(0.0632)	(0.0426)
INCOME	0.0554 **	-0.0276	0.0030	-0.0276	0.0554 **
	(0.0257)	(0.0282)	(0.0179)	(0.0282)	(0.0257)
POPDENS	-0.0350	-0.0556	-0.0016	-0.0556	-0.0350
	(0.0721)	(0.0703)	(0.0347)	(0.0703)	(0.0721)
NEAST	-0.0922	0.0936	0.0215	-0.1001	0.0773
	(0.1090)	(0.1242)	(0.0824)	(0.0795)	(0.0606)
SOUTH	-0.0043	0.0350	0.0141	-0.0995	0.0547
	(0.1078)	(0.1085)	(0.0669)	(0.0717)	(0.0435)
WEST	-0.1559 *	0.0631	0.0044	0.0100	0.0784
	(0.0944)	(0.1143)	(0.0674)	(0.0931)	(0.0522)
ANIMR	-0.0076	0.0239	-0.0438 **	0.0239	-0.0076
	(0.0290)	(0.0330)	(0.0198)	(0.0330)	(0.0290)
ENVK	-0.0327	0.0200	-0.0173	0.0200	-0.0327
	(0.0308)	(0.0318)	(0.0243)	(0.0318)	(0.0308)
LOCALBIZ	0.0335	0.0201	-0.0464 *	0.0201	0.0335
	(0.0372)	(0.0423)	(0.0263)	(0.0423)	(0.0372)
NEWREST	-0.0932 **	0.0594	0.0320	0.0594	-0.0932 **
	(0.0408)	(0.0444)	(0.0260)	(0.0444)	(0.0408)
FORGFOOD	0.1474 **	-0.1703 **	-0.0032	-0.1703 **	0.1474 **
	(0.0718)	(0.0755)	(0.0436)	(0.0755)	(0.0718)
FORGWOOL	-0.0084	0.0404	-0.0142	0.0404	-0.0084
	(0.0396)	(0.0457)	(0.0294)	(0.0457)	(0.0396)

*The numbers in parentheses denote standard errors. *, **, *** denote statistical significance at 10, 5, and 1% levels, respectively.*

Estimated Marginal Effects of Multinomial Logit Model, Version A_On-line

	Pr(COO-focused)	Pr(Animal - focused)	Pr(Environment-focused)	Pr(Acrylic)	Pr(Cheapest Wool)
Constant	0.2358	-0.4914 **	-0.1468	0.2238	0.1786
	(0.3115)	(0.2415)	(0.1121)	(0.1938)	(0.3107)
FEMALE	0.0637	-0.1064	0.0182	-0.0197	0.0442
	(0.0837)	(0.0702)	(0.0236)	(0.0576)	(0.0842)
AGE	0.0664	-0.0819 ***	0.0090	0.0800 ***	-0.0735 *
	(0.0412)	(0.0288)	(0.0131)	(0.0271)	(0.0414)
EDUC	0.0277	0.0129	-0.0180	-0.0234	0.0008
	(0.0358)	(0.0232)	(0.0126)	(0.0245)	(0.0357)
ALLERGY	-0.1372 **	0.1096 **	-0.0492 *	0.0161	0.0607
	(0.0672)	(0.0471)	(0.0268)	(0.0451)	(0.0680)
PET	-0.0578	0.0171	0.0197	0.0198	0.0013
	(0.0754)	(0.0514)	(0.0221)	(0.0481)	(0.0752)
INCOME	-0.0441	0.0356 **	0.0072	-0.0019	0.0033
	(0.0268)	(0.0167)	(0.0080)	(0.0182)	(0.0259)
POPDENS	0.0204	0.0282	0.0526	-0.0514	-0.0498
	(0.0831)	(0.0605)	(0.0349)	(0.0509)	(0.0845)
NEAST	0.1713 *	0.0415	-0.0312	-0.0925	-0.0891
	(0.0980)	(0.0579)	(0.0355)	(0.0655)	(0.0846)
SOUTH	-0.0798	0.0496	-0.0292	-0.1045 *	0.1639 *
	(0.0790)	(0.0551)	(0.0332)	(0.0557)	(0.0860)
WEST	-0.0386	0.0876	-0.0506	0.0032	-0.0016
	(0.1015)	(0.0816)	(0.0362)	(0.0842)	(0.0996)
ANIMR	-0.0134	0.0473 **	-0.0011	-0.0086	-0.0242
	(0.0275)	(0.0208)	(0.0089)	(0.0177)	(0.0279)
ENVK	0.0187	-0.0001	-0.0199 ***	0.0011	0.0002
	(0.0155)	(0.0106)	(0.0068)	(0.0105)	(0.0153)
LOCALBIZ	0.0115	-0.0214	0.0110	-0.0189	0.0177
	(0.0340)	(0.0250)	(0.0117)	(0.0213)	(0.0349)
NEWREST	0.0348	0.0214	0.0043	0.0021	-0.0626 **
	(0.0302)	(0.0202)	(0.0092)	(0.0210)	(0.0316)
FORGFOOD	-0.1152 **	0.0592 *	-0.0132	-0.0313	0.1006 **
	(0.0460)	(0.0310)	(0.0150)	(0.0300)	(0.0462)
FORGWOOL	0.0251	-0.0120	0.0050	-0.0316	0.0135
	(0.0427)	(0.0269)	(0.0129)	(0.0286)	(0.0402)

*The numbers in parentheses denote standard errors. *, **, *** denote statistical significance at 10, 5, and 1% levels, respectively.*

Estimated Marginal Effects of Multinomial Logit Model, Version C_Mail

	Pr(COO-focused)	Pr(Animal-focused)	Pr(Environment-focused)	Pr(Acrylic)	Pr(Cheapest Wool)
Constant	0.4603	0.1098	-0.0604	-0.2340	-0.2757
	(0.3987)	(0.4146)	(0.1734)	(0.1581)	(0.1798)
FEMALE	0.1028	-0.1606 **	-0.0291	-0.0183	0.1052 **
	(0.0789)	(0.0812)	(0.0335)	(0.0270)	(0.0453)
AGE	0.0137	-0.0128	0.0036	-0.0278 *	0.0234
	(0.0473)	(0.0497)	(0.0205)	(0.0168)	(0.0225)
EDUC	-0.0101	0.0539	-0.0201	0.0068	-0.0306 *
	(0.0384)	(0.0403)	(0.0170)	(0.0136)	(0.0173)
ALLERGY	0.0886	-0.1180	0.0206	-0.0149	0.0237
	(0.0759)	(0.0801)	(0.0309)	(0.0270)	(0.0347)
PET	0.0271	0.0376	-0.0756 *	0.0164	-0.0056
	(0.0795)	(0.0835)	(0.0436)	(0.0247)	(0.0394)
INCOME	0.0123	-0.0315	0.0001	0.0028	0.0162
	(0.0288)	(0.0297)	(0.0118)	(0.0094)	(0.0135)
POPDENS	-0.0741	-0.0257	0.0003	0.1177 ***	-0.0182
	(0.0549)	(0.0571)	(0.0280)	(0.0365)	(0.0201)
NEAST	-0.0534	0.1249	0.0160	-0.0326	-0.0549
	(0.1181)	(0.1232)	(0.0450)	(0.0331)	(0.0451)
SOUTH	-0.0516	0.0329	0.0161	-0.0174	0.0200
	(0.0942)	(0.0995)	(0.0373)	(0.0319)	(0.0551)
WEST	-0.0082	-0.0892	0.0467	0.0478	0.0028
	(0.1088)	(0.1097)	(0.0492)	(0.0526)	(0.0554)
ANIMR	-0.0175	0.0041	0.0041	-0.0174 *	0.0267 *
	(0.0277)	(0.0290)	(0.0123)	(0.0099)	(0.0152)
ENVK	-0.0190	-0.0050	-0.0013	0.0116	0.0136
	(0.0358)	(0.0373)	(0.0141)	(0.0100)	(0.0110)
LOCALBIZ	-0.0350	0.0245	-0.0017	-0.0067	0.0189
	(0.0428)	(0.0454)	(0.0171)	(0.0151)	(0.0191)
NEWREST	-0.0719	0.0759	-0.0290	0.0134	0.0116
	(0.0474)	(0.0470)	(0.0241)	(0.0149)	(0.0172)
FORGFOOD	0.0220	-0.0370	0.0273	0.0054	-0.0177
	(0.0714)	(0.0739)	(0.0285)	(0.0228)	(0.0302)
FORGWOOL	-0.0222	0.0630 *	-0.0026	-0.0357 **	-0.0025
	(0.0378)	(0.0373)	(0.0127)	(0.0179)	(0.0149)

*The numbers in parentheses denote standard errors. *, **, *** denote statistical significance at 10, 5, and 1% levels, respectively.*

Estimated Marginal Effects of Multinomial Logit Model, Version C_On-line

	Pr(COO-focused)	Pr(Animal -focused)	Pr(Environment -focused)	Pr(Acrylic)	Pr(Cheapest Wool)
Constant	-0.3515	-0.1053	-0.1891 **	0.0358	0.6102 **
	(0.2734)	(0.2479)	(0.0884)	(0.1882)	(0.2647)
FEMALE	-0.1743 *	0.1118	-0.0158	0.0262	0.0522
	(0.0939)	(0.0722)	(0.0293)	(0.0572)	(0.0749)
AGE	0.0183	0.0256	-0.0043	0.0596 **	-0.0992 ***
	(0.0368)	(0.0345)	(0.0112)	(0.0244)	(0.0361)
EDUC	0.0287	-0.0255	-0.0042	-0.0625 **	0.0635 **
	(0.0372)	(0.0351)	(0.0110)	(0.0273)	(0.0341)
ALLERGY	-0.0536	-0.0972	-0.0127	0.0786	0.0849
	(0.0706)	(0.0632)	(0.0222)	(0.0485)	(0.0643)
PET	0.0401	0.1350 **	-0.0148	0.0254	-0.1857 **
	(0.0858)	(0.0671)	(0.0305)	(0.0537)	(0.0847)
INCOME	-0.0154	0.0119	0.0040	0.0156	-0.0161
	(0.0278)	(0.0252)	(0.0084)	(0.0180)	(0.0252)
POPDENS	0.0393	-0.0712 **	0.0410 *	0.0132	-0.0223
	(0.0432)	(0.0347)	(0.0237)	(0.0259)	(0.0373)
NEAST	0.0438	-0.1995 **	-0.0227	0.0757	0.1027
	(0.0967)	(0.0945)	(0.0273)	(0.0702)	(0.0928)
SOUTH	0.0699	-0.1517 *	-0.0001	0.0751	0.0068
	(0.0851)	(0.0864)	(0.0262)	(0.0626)	(0.0737)
WEST	0.2084 **	-0.2640 ***	0.0025	-0.0248	0.0778
	(0.1054)	(0.0872)	(0.0344)	(0.0554)	(0.0979)
ANIMR	0.0904 ***	0.0238	0.0114	-0.0330 *	-0.0927 ***
	(0.0314)	(0.0278)	(0.0106)	(0.0195)	(0.0266)
ENVK	-0.0001	0.0143	-0.0114 *	0.0121	-0.0150
	(0.0161)	(0.0144)	(0.0068)	(0.0107)	(0.0151)
LOCALBIZ	-0.0287	-0.0239	0.0123	0.0349	0.0054
	(0.0378)	(0.0324)	(0.0117)	(0.0241)	(0.0350)
NEWREST	0.0647 *	0.0579 **	0.0106	-0.0377	-0.0956 ***
	(0.0330)	(0.0288)	(0.0100)	(0.0252)	(0.0325)
FORGFOOD	-0.0378	0.0243	0.0223	-0.0515	0.0427
	(0.0479)	(0.0447)	(0.0187)	(0.0316)	(0.0474)
FORGWOOL	0.0155	0.0113	-0.0043	-0.0393	0.0168
	(0.0426)	(0.0389)	(0.0120)	(0.0316)	(0.0396)

*The numbers in parentheses denote standard errors. *, **, *** denote statistical significance at 10, 5, and 1% levels, respectively.*