How Local is Locally Produced Food? A Choice Analysis on Red Tomatoes and Gala Apples

by

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Abstract

HOW LOCAL IS LOCALLY PRODUCED FOOD? A CHOICE ANALYSIS ON RED TOMATOES AND GALA APPLES

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This study investigates Canadian consumers’ preferences for organic and locally produced fresh produce. The analysis is based on two choice experiments, one for red tomatoes and one for gala apples, and implemented through an internet based survey. The choice experiments address two important research questions. First, what attributes do Canadians associate with when purchasing locally produced organic foods. Second, to what degree do the identified attributes influence consumers’ purchasing decision?

Results from the food scale reveals that price, taste, and freshness were the top three important factors when purchasing organic and local food. From the exploratory factor analysis, underlying latent constructs regarding purchasing motives for organic and local food share similar factors. Results from conditional logit regression model suggests that there is a disutility associated with food mileage, where respondents were willing to pay a premium of $0.0061 per ten kilometres per kilograms and $0.0044 per ten kilometres per kilograms of tomatoes and apples respectively. Respondents were also willing to pay a premium for the authentication of “organic-ness”, and in the case of gala apples, respondents were indicating a disutility for non-certified organic apples.
Acknowledgement

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Chapter 1

Introduction

1.1 Background

Over the last 20 years, consumer demand for organic food has increased rapidly (Moser, Raffaelli and McFadden, 2011), particularly in developed countries such as USA, Canada and Europe (Denver and Jensen, 2014). The Food and Agricultural Organization (2009) estimated that the global market for organic food was valued at $45 billion USD in 2007. In Canada, the demand for organic food has grown by 20 per cent annually (AAFC, 2013). According to Agriculture and Agri-Food Canada (AAFC), there are currently 3,200 organic producers on 1.16 million acres of crop land, 320 organic processors, and estimated a 20 percent annual growth in the organic retail sales (AAFC, 2013) Although these statistics suggest the Canadian organic market is growing rapidly, the size of the organic market actually comprises a small share of the total food market. Despite the small market share, rapid growth in the demand for organic food has generated much interest among consumers, businesses and researchers.

Interest in organic agriculture has prompted numerous studies to better
understand consumers perception of organic food, and speculated on the factors which determine organic food consumption. According to Bellows et al. (2008); Yue and Tong (2009); Yiridoe et al. (2005); and Onozaka and McFadden (2011), income, education, gender and age were identified as important socio-demographic factors that correlate with the consumption of organic food. However, consumer perception that is loosely defined along the dimensions of environmental stewardship (Yiridoe et al., 2005), sustainability (Constanigro et al., 2011), quality (Grunert, 2005), and safety (Voon et al., 2011) was equally, if not more, important when trying to understand the motives for purchasing organic. According to Denver and Jensen (2014), organic food products embody two types of attributes: private and public good attributes. Private good attributes that correlate with the consumption of organic food include: healthier, better tasting, and more fresh than conventional counterpart (Yiridoe et al., 2005). Public good attributes include: increased animal husbandry, lower pesticide usage, more environmental friendly, and sustainable methods. Interestingly, some of the literature has identified price premiums to be the single most important factor considered by the consumer when purchasing organic food (Denver and Jensen, 2014).

To keep pace with the increasing demand for organic food, the scale of organic food production increased (Yiridoe et al., 2005). Although the large scale production of organic must also fulfil the same stringent organic standards as with smaller scale production, some aspects of the public good attributes and principles could not be replicated through large scale production. According to Denver and Jensen (2014) and Smithers et al. (2008), public attributes such as environmentally friendly, reduced food mileage, and fair trade do not transfer over to large scale production of organic foods.
expanded. As the organic market continues to grow, the public good principles that have characterized organic are slowly depreciating and consumers are once again faced with many of the same problems of conventional agricultural practices (Adams and Salois, 2005; Moser et al., 2011; Denver and Jensen, 2014).

Literature on consumer choice also suggest that consumers who had purchased organic foods were also interested in locally produced foods (Denver and Jensen, 2014; Darby et al., 2008; Loureiro and Hine, 2002; Yiridoe et al., 2005; Onozaka and McFadden, 2011). The positive consumer interest in local food can be traced back to the perception of higher food quality and freshness of locally produced foods. Furthermore, locally produced food is often characterized by short supply chains that will foster more direct contact between producers and consumers. This direct contact between consumers and producers further reinforces a sense of trustworthiness in the safety and quality of the food product. Other motivators for consumer interest in local food include the promotion of local job and market access, and an increase in environmental stewardship. According to Milestad et al. (2010), consumers of local food perceive themselves as supporting the local community and businesses through their purchasing habit. While Adams and Salois (2005) observed that consumers perceive local food to be more environmental friendly due to reduced food miles stemming from a shorter supply chain.

The literature on the factors which determine organic and local food consumption seems to share similar results. According to Zepeda and Deal (2009), consumers associate many of the same features of organic food with local food, such as environmental friendliness, safety, animal welfare and higher quality. However, quantitative studies that investigated the relation-
ship between consumers’ perception and demand for organic and local food were inconclusive and results were often ambiguous (Denver and Jensen, 2014).

In the Canadian context, part of the ambiguity regarding consumers’ perception of organic and local can be attributed to the loosely defined terms of organic and local. According to The Ontario Ministry of Agriculture and Food (OMAF), organic farming is defined as the production method that is more holistic, sustainable and harmonious with the environment. This definition of organic food is loosely defined along dimensions such as environmentally friendly, sustainable, naturally produced, green, and limited use of pesticide (Voon et al., 2011; Moser et al., 2011; Yue and Tong, 2009). While local is defined by the Canadian Food Inspection Agency as: “an item must originate no more than 50 kilometres from the place its sold”. Note however, the current definition of local is being discussed to include all products produced within the province as local, rather than 50 kilometres.

Against this backdrop, it is unknown if the factors that consumers associate with local food share any similarities with organic food, and whether the prescribed definition from the government body resonate with the consumers. According to Lusk (2011), each consumer may share a similar broad overview of the factors that make up an organic or local food, however, empirically each consumer defines organic and local differently. If the policy definition of organic and local is different from consumers perceptions of local or organic, then the defining policy or regulations may lead to the production of goods for which there is little demand. Three key questions arise from this uncertainty. First, how local is local food? Second, what food attributes do Canadians associate with local food, organic food, and locally produced organic food? Third, what are the premiums that Canadian con-
sumers are willing to pay for the identified attributes?

Information about consumers valuation of locally produced organic food has implications for food marketers and producers. Such information provides useful market intelligence for government institutions and producers in establishing new niche markets and to evaluate alternative policies. With the help from researchers on discovering market intelligence on consumers motivation and willingness to pay for organic local food, such knowledge mobilized by producers will facilitate the development of new supply chain (Costanigro et al., 2011) in response to real market demand for differentiated food products such as locally produced organic foods.

1.2 The Economic Problem

Currently, organic fresh fruits and vegetables dominate the organic market. However, uncertainty exists with respect to how the market and consumers will react to other types of organic foods, such as meats, grains, and processed foods. Figure 1 illustrates that fresh fruits and vegetables accounted for over 80 per cent of total organic imports into Canada in 2008. Canada's organic food industry and the farming industry is not as advanced as United States, with much of Canada's organic market crowded with imports.

Figure 2 illustrates the country of origin of organic products sold at the Canadian retail level in 2008. The Canadian organic food industry and farming industry only accounts for a quarter of the total market. Barriers to entry into the organic industry and farming, and impediment in the transition from a mainstream market to a niche market is present, as signalled by the dominance of foreign organic food imports into Canada.

According to Yue and Tong (2009), competition from large-scale growers has forced small-scale farmers into finding new niche markets through value
added marketing to sell their commodities. However, discovering the right niche market is difficult, since demand from the consumer sector is highly segmented where consumers may be concerned with different attributes such as, pesticide free, local, organic, non-GMO and other specialty types. Understanding consumers preferences and willingness to pay for organically grown and/or locally grown foods with different attributes is important for stakeholders (farmers, marketers, and governmental institutions). Market intelligence will provide stakeholders with insight into the type of food products to grow and sell, the most effective marketing channels, and the size of the premium to charge consumers. Previous studies on consumer preferences and willingness-to-pay for both organically and locally grown food product are sparse. Loureiro and Hine (2002) found that locally grown potatoes were often associated with the highest consumer acceptance and premium, followed by organic and GMO free. However, their research only included a small subset of consumer attitudes, and many other psychographic factors were not included (e.g. presence of small children, taste, food safety), which others (Grunert, 2005; Yue and Tong, 2011) have found to be significant.
Figure 1.2: Country of Origin Of Organic Products Sold at the Canadian Retail Level

Sources: Agriculture and Agri-Food Canada, from the Organic Producers section: The Canadian Organic Sector, Trade Data and Retail Sales in 2008

...in shaping the consumer’s motivation to buy organic and/or locally grown food. Further research is warranted to examine consumer demand for organic and/or local food products in niche market, and to generate market intelligence on segments of the Canadian consumers.

1.3 The Economic Research Problem

The current market environment for food is focused on product differentiation by information, purchasing channels and certifications that verify production practices. Onozaka and McFadden (2011) observed that this trend is particularly noticeable in the organic/local niche that are characterized by the emergence of eco-friendly, socially labeled product. While food markets are becoming more globalized, food supply chains have transformed from shorter and more independent product flows to more unified, and larger scale operations (Abatekassa and Peterson, 2011). At the same
time, different actors in the food supply chain view local food products as a potential source of value (Forsman and Paananen, 2002). Selfa and Qazi (2005) and Constanigro et al. (2011) argue that local food products within a supply chain enhances, food security, health, and supports communities. Furthermore, there is a perception that local food systems are often associated with social, economic and environmental health benefits. Consequently, consumers are changing their food consumption behaviours, seeking local food products for a variety of reasons (Abatekassa and Peterson, 2011).

The Canadian organic market is unique, with different terms in the certification process, products distribution structure, and market life cycle (Essoussi and Zahaf 2009). The plethora of research in consumer attitudes towards organic food products undertaken in Europe and United States (Batte et al. 2007, Loureiro et al. 2001, Loureiro and Hine 2002, Govindasamy et al. 2001, and Bredahl and Grunert 1997) uncovered the mindset of organic food product consumers in these regions, but this identification is unlikely to hold the same for Canadians due to differences in culture that leads to differences in values towards organic food consumption. Currently, little is known about the mindset of Canadians that purchase organic and/or local foods. Particularly little is known about whether Canadians prefer organically grown or locally grown produce and what is their willingness to pay for fresh produce with different attributes (Yiridoe et al., 2005; Essoussi and Zahaf, 2009). While fruits and vegetables have dominated the organic market, it is uncertain how the current market will respond to other types of organic foods such as organic meats, grains and processed foods. Since there are significant perceived benefits associated with organic food consumption, the result of this study will assist OMAF and stakeholders to better understand consumers’ mindset and decision-making process for when they
purchase organic and/or local food products. Knowledge on the consumer side of the market the Canadian organic food industry by providing a more complete market profile. The dissemination of benefits does not only accrue to the producers, distributors and retailers along the supply chain would also capture a portion of the economic benefits.

Previous work has examined consumer demand for food products in niche markets, and several studies evaluated consumers willingness to pay for product attributes including organically produced, locally grown, and other nutritional claims. This paper will extend the line of research on Canadian consumer demand for differentiated products by evaluating what, how, where, and why Canadian consumers purchase organic and/or local red tomatoes and gala apples, exploring the Canadian consumers decision-making process, and the external product attributes that influences the cognitive motivations.

1.4 Purpose and Objectives

This research aims to develop an understanding on how organic and locally produced foods interact, despite subtle differences in characteristics and attributes. Since this present study is part of a larger research project, the analysis will focus strictly on the fresh, non-processed food products: red tomatoes and gala apples.

Much work has been looking at consumer demand for organic fresh produce, and local fresh produce. Yet relatively little research has examined organic and local fresh produce, processed foods, and meats (Yiridoe et al., 2005). Thus, the first objective of this paper is to examine the strands of literature on consumers purchasing and decision-making process regarding organic and locally produced foods.
While Loureiro and Hine (2002) examined consumers willingness-to-pay for organic and local potatoes, the consumer purchase decision related to organic and local attributes has not been examined for processed foods. Previous studies did not allow for market wide assessment of consumer values to include psychographic factors (Onozaka and McFadden, 2011). Thus, the second objective is to identify how various external attributes associated with organic and local food products affect the likelihood of purchasing by conducting an online survey of consumers in Canada and evaluating the type of product, information signals, availability, occasion, and emotional response observed in the survey.

The third objective is to investigate the main factors that influence consumption of organic and/or local food products among Canadian consumers. Estimated willingness-to-pay for the attributes that the Canadian consumers deemed as important in their purchasing decision for organic and/or local food will be used to measure the degree of importance. Price, food mileage between production to consumption at the home, distribution channels and production systems are the attributes to be investigated.

1.5 Method

This research will utilize a stated choice framework based on the work of Louviere, Hensher and Swait (2000) and Hensher, Rose, and Greene (2005). The framework will include a stated choice experiment that is embedded in an internet survey. Data will be collected from a national web based survey conducted by a third party company - Ipsos Marketing (Agriculture and Animal Health). A conditional logit model will then be estimated with the collected data, followed by estimates of willingness-to-pay for the identified attributes.
1.6 Organization of This Thesis

This research is organized into six chapters. Chapter 1 provides background information and historical outlook on the Canadian market and the governing standards for organic and locally produced food. Chapter 2 presents the literature review on the organic and local food market, food quality and preferences. The main purpose of the literature review was to identify factors that may influence the purchasing decision on organic and locally produced foods, understand how the characteristics of organic and local interact and establish any relationship between organic, local and food miles. Chapter 3 introduces the stated choice modelling framework. Chapter 4 builds on the framework developed in Chapter 3 by presenting the empirical model of the framework. Chapter 5 will present the empirical results based on the conditional logit model. Chapter 6 is a summary of the findings, where the results, market implications, policy implications, and limitations will be discussed.
Chapter 2

Literature Review

2.1 Introduction

This chapter will present a review of previous studies that have worked on consumer behaviour and preferences for organic and/or locally produced food. The purpose of this chapter is to identify literature gaps and to lay the foundational questions that this research will address. In an increasingly globalized food economy, food production chains are becoming progressively more complex. Consumers are also more disconnected from the land since fewer people are directly involved with producing food. In this context, a subsection of consumers are becoming more conscious of the production process. Organic and locally produced foods are products produced to cater this niche market. Consequently, attention is focused on food quality and preference related studies to gain insight and to measure consumer preferences, the size of the market, and willingness to pay for attributes embodied in niche products. Previous studies that attempted to measure the size of this niche market has treated organic and local as two discrete variables, with local assumed to be a fixed unit of distance (for example, the 100 mile
diet).

2.2 Food Quality

In the past decade, food quality has been a highly debated topic in both public and private sectors. Several factors have motivated this debate. First, recent food contamination incidents have caused the public and consumers to be more conscious about food safety. Onozaka and McFadden (2011) saw that consumer interest in locally grown food was in response to increasing distrust of a highly industrialized food production chains and imports. Second, a segment of consumers have become more critical about the production methods for growing and processing food. As a result, there were increasing debates and discussions on organic production, animal welfare, environmentally friendly and locally produced foods. Furthermore, Grunert (2005) saw that consumers in developed countries were becoming more critical, with food demand differentiated on both vertical and horizontal dimensions. These developments have led to consumer food choices becoming more fragmented, and more complicated to fulfil.

2.2.1 What is Quality?

Quality has an objective and a subjective dimension according to Grunert (2005). Objective quality is defined by the physical characteristics inherent in the product. Subjective quality is the quality as perceived by the consumer. The relationship then between objective and subjective is of importance when defining quality. Only when a producer can identify with and translate a consumer wish or desire into a physical product characteristic, and only when the consumer can infer desired qualities from the product, can quality be used as a comparative parameter for food (Grunert, 2005).
Food quality can also be indicated by product-oriented, process-oriented and consumer-oriented parameters. While the first two parameters are objective based, consumer-oriented quality is influenced by subjective factors. To measure consumer-oriented quality, Grunert (2005) proposed two dimensions along which subjective food quality perception can be analysed: a horizontal time dimension, and a vertical dimension that links product characteristics to abstract quality dimensions. Along the horizontal time dimension, perception of quality is distinguished before and after the purchase to confirm or refute the consumers’ pre-purchase expectation of the food quality. Subsequently, this satisfaction or dissatisfaction will play a role in the probability of repurchasing such food products. Along the vertical dimension, quality is inferred from the intrinsic benefit from the food product, where consumers are not interested in the products per se but in what the product is doing for them.

Product specific attributes are not the only food quality dimension. Food quality can also be defined by dimensions of public good attributes, for example, environmental stewardship and the consumer perception of local community involvement. These public good attributes were particularly significant and useful in explaining consumer purchasing habits for organic and local food. Winter (2003), referred to the public good attribute as dimensions of social embeddedness. Thus, a consumer choice of local food that encompasses the notion of social relations based on trust and familiarity between producers and consumers is referred to as social embeddedness (Winter, 2003; Cranfield et al., 2012). In this context, food purchases and consumption occasion becomes more than just market interactions. Every transaction is based on market relations and close social/inter-personal ties (Winter, 2003). For example, Thilmany et al. (2008) revealed that
consumers believe that frequenting direct sources is a more effective means of verifying credibility about a particular claim than certifications such as USDA labels. From the perspective of social embeddedness, economics, social and ecological factors are all entwined in the consumers purchasing decision for organic and local food.

2.2.2 Quality in Agribusiness

As consumers become more demanding of the quality of food products, agri-food products that had once competed on price and lower production costs on a homogeneous food product are becoming more obsolete and lower priced products are becoming less prevalent (Grunert, 2005). As consumer demand becomes more fragmented, heterogeneous and dynamic, Grunert (2005) identified that opportunity exists for new agribusinesses to target these specific niche markets under certain circumstances. Only when producers and value chains that are willing to risk differentiating their products in response to serving specific target markets, and to adapt to local conditions will it be able to capture this opportunity (Mannion et al., 2000). When sectors in the agribusiness take on the risk of differentiating their products to serve in the specified niche market, the sectors are no longer competing for efficiency, but also now on value added products. Organic production, enhanced animal welfare treatment, fair trade, sustainably fished, and locally produced are examples of producers responding to niches carved by fragmented consumer valuation of production practices.

2.2.3 Summary

Quality is a parameter that consumers’ rely upon to make inferences about their purchasing decision. In the context of food quality, there are multiple
dimensions of quality: product oriented, process oriented, consumer oriented or culturally oriented. Each dimension of quality is also represented by the fragmentation of the consumer segment - one segment maybe more concerned with the cultural dimensions that organic product represents, while another segment is more inclined to purchase organic food because of its product oriented quality. Thus, an opportunity exists for agribusinesses to target these specific niche markets when producers are willing to risk differentiating their products. It is equally important for markets dealing with differentiated quality to communicate cues and signals to consumers.

2.3 Literature Review of Consumers’ Perception and Preferences Towards Organic Foods

In this section, consumer preference for organically produced foods and the factors explaining consumers’ choice of organic food will be explored. The purpose of this section is to establish a context to explain the attributes which affect choice of an organic food product. To establish the context, organic is first defined, that is followed up with the identification of attributes that an organic food would possess.

2.3.1 What is Organic?

When a product is certified organic in Canada, it means such product’s ingredients and production methods have met the Canadian Organic Standard. The standard is laid out by the Federal government, which specifies organic production practices, including how livestock are housed, fed, and slaughtered; how crops are grown, harvested, processed and stored; regulates the use of pesticides and chemical substances; and determines environmen-
tal compliances (Canadian Food Inspection Agency, 2011). The Canadian Federal government’s definition of organic highlights dimensions of technology and production practices. This is in contrast with a typical organic consumer’s view, where organic is perceived as more philosophical and associated with the notion of social embeddedness (Yiridoe et al., 2005; Adams and Salois, 2010; Hjelmar, 2011).

A consumer’s choice in favour of organic is decided by comparing a bundle of observable and unobservable characteristics of the good. According to Moser et al. (2011) and Yiridoe et al. (2005) an unobservable characteristic is often referred to as a credence attribute. A credence attribute relates to asymmetric knowledge regarding the attributes of an organic product. That is, consumers may not necessarily possess all the required market intelligence to determine the desired organic characteristics even after purchase. Consequently, consumers do not know whether a product is organic until they are informed either through the label, word of mouth, or certification by a third party. Quality signals like product labels transform the credence characteristics into searchable attributes (Moser et al., 2011; Van Loo et al., 2012; Onozaka and McFadden, 2011), allowing consumers to assess the product quality.

2.3.2 Attributes of Organic Foods

Attributes that consumers often associate with organic foods are: food safety, human health environmental and farm animal welfare, and commodity specific attributes (including nutritional value, taste, and freshness). Table 2.1 summarizes the broad groups of organic food quality recognized by consumers of organic food.
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Field of Study</th>
<th>Type of Model</th>
<th>Attributes Investigated</th>
<th>Experiment Design</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bellows et al., (2008)</td>
<td>Organic</td>
<td>N/A</td>
<td>N/A</td>
<td>Survey</td>
<td>Factor analysis</td>
</tr>
<tr>
<td>Chang and Lusk (2009)</td>
<td>Organic bread</td>
<td>Stated-preference</td>
<td>Price; equity distribution to, small, medium, large farmers; fairness; distribution channel</td>
<td>Mail survey</td>
<td>Fairness model with RU</td>
</tr>
<tr>
<td>Constangro et al., (2011)</td>
<td>Apples</td>
<td>Discrete choice experiment</td>
<td>Local; organic; price; fairness; COOL</td>
<td>Field experiment</td>
<td>Factor analysis</td>
</tr>
<tr>
<td>Cranfield et al., (2012)</td>
<td>Fresh fruits, vegetables, dairy; Frozen vegetables; processed meat; canned fruits, vegetables</td>
<td>Stated-choice model</td>
<td>Opinions towards farmers and agriculture; factors influencing food choices and food involvement</td>
<td>Online survey</td>
<td>Branstein probit model</td>
</tr>
<tr>
<td>Duram and Oberholtzer (2010)</td>
<td>Local food systems</td>
<td>Literature summation</td>
<td>Food mile; climate; transportation; community; diet; agricultural operation</td>
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<td>N/A</td>
</tr>
<tr>
<td>Grebitus, Lusk, Nayga (2013)</td>
<td>Local red apples and wine</td>
<td>Experimental auction</td>
<td>Food miles; freshness; taste; safety; environmental soundness</td>
<td>Non-hypothetical second price auctions</td>
<td>Tobit model</td>
</tr>
<tr>
<td>Innes and Hobbs (2011)</td>
<td>Bread</td>
<td>Discrete choice experiment</td>
<td>Price; trust; pesticide free; environmental sustainability</td>
<td>D-optimal choice design</td>
<td>Multinomial logit</td>
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<tr>
<td>Louwiro and Umbenner (2006)</td>
<td>Beef steaks</td>
<td>Choice experiment</td>
<td>Price; COOL, traceability; food safety; tenderness</td>
<td>Tailored design</td>
<td>Discrete choice conditional logit</td>
</tr>
<tr>
<td>Lusk (2011)</td>
<td>Organic egg and milk</td>
<td>Discrete choice experiment</td>
<td>Naturalness; taste; price; safety; convenience; nutrition; tradition; origin; fairness; appearance; environmental impact</td>
<td>Paired comparison</td>
<td>Logit model</td>
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<td>Lusk and Schroder (2004)</td>
<td>Beef steaks</td>
<td>Choice experiment</td>
<td>Price</td>
<td>N/A</td>
<td>Multinomial logit model</td>
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<tr>
<td>Onozaka and McFadden (2011)</td>
<td>Gala apples and red tomatoes</td>
<td>Choice experiment</td>
<td>Organic, fair trade; carbon footprint; price</td>
<td>D-optimal choice design</td>
<td>Panel mixed logit model</td>
</tr>
<tr>
<td>Onozaka, McFadden (2010)</td>
<td>Organic gala apple and red tomato</td>
<td>Conjoint choice experiment</td>
<td>Certified: organic, fair trade; carbon footprint; locally grown; domestic; imported; price</td>
<td>N/A</td>
<td>Panel mixed logit model</td>
</tr>
<tr>
<td>Omyango, Hallman, Bellows (2007)</td>
<td>Organic food product</td>
<td>Discrete choice experiment</td>
<td>Naturalness; diet; age; education</td>
<td>Interviews with likert-scale response</td>
<td>Multinomial logit model</td>
</tr>
<tr>
<td>Smithers, Lomarche, Joseph (2008)</td>
<td>Farmers market</td>
<td>Descriptive summary</td>
<td>Locality; freshness; trust; interactions with farmers; vendor experience</td>
<td>N/A</td>
<td>Multinomial logit model</td>
</tr>
<tr>
<td>Yue and Tong (2009)</td>
<td>Organic and local tomatoes</td>
<td>Discrete choice experiment</td>
<td>Organic; local; price</td>
<td>N/A</td>
<td>Multinomial logit model</td>
</tr>
</tbody>
</table>
**Food Safety**

Attributes of organic food are often difficult to identify by visual inspection alone. Yet most consumers purchase organic food products because they have the perception that organically produced foods possess superior quality compared to their conventional counterparts (Yiridoe et al., 2005; Voon et al., 2011). Food safety is an attribute often associated with organic foods, where purchases of organic foods are primarily driven by perception. According to Van Loo et al. (2012), the primary reason for organic food purchase is because consumers often have the perception that organic foods are safer and healthier than conventional foods.

Midmore et al. (2011) found that organic was often referred to as an alternative choice to industrialized agriculture, while conventional food was perceived to be inferior in food quality. This perception is motivated by recent food contamination incidents tracing back to foreign sources (Onozaka and McFadden, 2011), leading consumers to view the current industrialized global food chain to be less safe. Thus, organic was seen as an alternative, guaranteed of naturalness and purity without pesticides, hormones or antibiotics, and associated with freshness and minimal processing (Yiridoe et al. 2005), and thus linked to a short distribution channel, on-farm production and self production (Midmore et al. 2011). Furthermore, for some consumers, organic was an assurance of food safety for processed foods when production methods were suspect. For example, Midmore et al. (2011) reported that eggs from high spatial density production systems were associated with poor quality. Consequently, organic, free range or barn eggs are chosen as alternatives.

Although consumers often have the perception of safety associated with organic food, the study by Van Loo et al. (2012) found no scientific evidence
that organic is healthier or more nutritious. Consumers in the U.S. were
often not aware or knowledgeable enough to know that organic standards
are based only on production methods and processing, not on final quality or
safety of the product. Detectable chemical residues, additives and pesticides
in organic foods are not necessarily zero, however they generally have lower
levels of residue than conventionally produced alternatives. Even if pesticide
residue is present, the concentration of pesticide in both conventional and
organic are less than the acceptable threshold level (Van Loo et al., 2012).

Despite the contrasting results of food safety, consumers knowledge of
organic food technology and the production process was mostly insufficient.
It is not known whether consumers are ill informed or chose not to become
better informed, or as Midmore et al. (2011) puts it: consumers felt over-
whelmed by the quantity of information need to make their food choices. It
is also not known if consumers perception on safety will change given the
proper education on organics. Although, Van Loo et al. (2012) found that
pesticide residue concentration from both production system is generally
very low. It is unclear if there are accumulative effects of exposure, and
what level of threshold is considered safe for infants and children. Thus, the
perception of safety attribute may also consist of a time dimension (discount
factor) and the household environment may also contribute to preferences
for safety.

Health and Nutritional Benefits

Organic food attributes may be difficult to assess by visual inspection, how-
ever most consumers who purchase organic products do so with the percep-
tion that such products have desirable attributes compared to their conven-
tional counterpart. Often, one of the benefits perceived by consumers of
organic food is that of improved health (Zepeda and Deal, 2009; Moser et al., 2011; Thilmany et al., 2008; Kriwy and Mecking, 2012). This view of perceived health improvement from consuming organically produced foods can be traced back to consumers’ perception regarding the use of pesticides in production, absence of artificial/synthetic ingredients, and nutrient content of organic foods relative to their conventional counterpart (Moser et al., 2011).

Grossman (1972) applied the theory of consumer demand to develop a model of consumer demand for good health: where human health was treated as a commodity, and health condition depreciates with time (age). Since human health deteriorates, Grossman hypothesized that individuals are motivated to purchasing various types of insurance to protect against such depreciation loss. Yiridoe et al. (2005) and Zepeda and Deal (2009) explains that individuals are motivated to protect against the depreciation of health overtime by purchasing insurance and/or hold excess stock of health. Organic foods can be viewed as one form of insurance or health stock, where the good health characteristics of organics are an input in the consumers demand for good health, subject to the price of organic foods as the cost of acquiring good health. Kriwy and Mecking (2012) report that middle age groups had the highest willingness to invest in health. This group of consumers recognized the importance of health in the long run, and to reap the benefits from long run investments such as education, these consumers are more likely to invest in their own health stock through the consumption of organic foods. Thus consumers with higher levels of education is more likely to purchase organic foods relative to a consumer with less education background, where all else is equal. The aforementioned studies that touched upon consumption of organic product as a health investment has embedded
some function of time aspect or influenced by time preference. However, none of the studies have delved into how future health benefits are discounted and how time preferences will influence perception of effectiveness of organic consumption and relate purchase decision.

In contrast, there have been studies that did not find significant relationship between personal health and organic food purchases. Zepeda and Li (2007); Van Loo et al. (2010); and Dangour et al. (2010) conclude that there is no evidence to support the claim that organic food is healthier or more nutritious than conventional. Furthermore, even if there is evidence of nutritional differences between organic and non-organic food, it is not known if those differences have an effect on the health of the consumer and the variation across the type of food.

**Socio-Demographic, Environmental and Commodity Specific Attributes**

As noted earlier, there is a general perception that organic products have more desirable attributes than conventional food products. Apart from food safety, and health considerations, other studies have compared demographic variables of income, age, education, gender, and household composition to consumers organic purchasing behaviour (Bellows et al., 2008; Yiridoe et al., 2005; Voon et al., 2011; Mesias et al., 2012; Hjelmar, 2011; Kriwy and Mecking, 2012).

Education and income were positively correlated to the likelihood of purchasing organic foods in most studies (Voon et al., 2011; Mesias et al., 2012; Yiridoe et al., 2005). Higher education and higher income were correlated with a higher likelihood to purchasing organic food products. Studies that have looked at the relationship between household composition and
the frequency of organic purchases were inconclusive. The tendency to buy organics was found to be invariant with household make up (Bellows et al., 2008). However, Yue and Tong (2009) found that presence of young children in the household was correlated with the higher likelihood of purchasing organic foods. Gender was also inconclusive with respect to its relationship with organic purchases. However, women were found to value organics food higher than men (Bellows et al., 2008), while other studies found no significant interactive effects between gender and attitudes towards organic food (Kirwy and Mecking, 2012).

Few studies have looked at the relationship between organic purchasing behaviour and the respondent lifestyle. It turns out there is no significance in the relationship between organic food purchasing and the frequency between cooking/degree of integral with food (Bellows et al., 2008; Van Loo et al., 2010). Relationships of self-reported understanding of food production knowledge were also inconsistent. Some studies thought that information seeking behaviour leads to more in depth knowledge of organic farming practices, which reinforce pre-existing values (Zepeda and Deal, 2009; Mesias et al., 2012). Hjelmar (2011) proposed that organic consumers are driven by convenience behaviours subjected to reflexive practices. Organic consumers are pragmatic, and requires that organic foods be readily available and convenient in response to the time constrained modern lifestyle.

2.3.3 Summary

Factors that drive demand for organic foods and factors that drive consumers’ propensity to buy organic foods are defined along dimensions of food safety; health and nutritional benefits; and socio-demographic, environmental, and commodity specific attributes. For example, consumers were often
found to perceive organic food products with the quality attributes of being safer (Van Loo et al., 2012) relative to conventional food - which was perceived to be inferior in food quality (Midmore et al., 2011). Yiridoe et al., (2005) and Zepeda and Deal (2009) suggest that consumer demand for organic foods was motivated by the perception of acquired health insurance from the consumption of organic foods. From the outlook that human health deteriorates overtime, organic foods that were perceived to hold food safety qualities were purchased as a type of insurance against such depreciation. However, previous studies have failed to recognize how future health benefits are discounted and how the rate of time preferences will influence the perception of effectiveness of organic consumption have on their health. Studies that looked into demographic variables and how such variables correspond with organic purchasing behaviour were often found to be inconclusive. For example, households with young children had a higher likelihood of purchasing organics (Yue and Tong, 2000) while others found no significant results (Bellows et al., 2008). Income and education were found to be positively correlated with the likelihood of purchasing organic foods.

2.4 Literature Review of Consumers’ Perception and Preferences Towards Local Foods

In this section, consumer preference for locally produced foods and the factors explaining consumers’ choice of local food will be explored. The purpose of this section is to establish a context to explain the attributes which affect choice of an local food product. To establish the context, local is first defined, that is followed up with the identification of attributes that an organic food would possess.
2.4.1 What is Local Foods?

A strict definition of local food is elusive. The most common interpretation of local food is the distance travelled by the local food, from place of production to the market where it was sold. The most common denomination of distance travelled is a 100-mile radius (Cranfield et al., 2012; Rose et al., 2008). However, the concept of local can also be decomposed into two degree of distances: within state and within sub-state region or nearby (Darby et al., 2008; Selfa and Qazi, 2005). The definition of local can also be related by shopping locale where local food is purchased. Farmers market, community supported agriculture and roadside stalls are common forms of supply for local food (Constanigro et al., 2011; Cranfield et al., 2012; Thilmany et al., 2008; McEachern et al., 2010).

2.4.2 Attributes of Local Foods

In order to understand consumer behaviour and purchasing patterns for local food, it is imperative to first explore the perceived qualities of a locally produced food. The make up of a local food can be perceived as a bundle of attributes that, together comprises of the food quality of being local. To explore this notion of local, there is a need to de-bundle "local" into the following perceived attributes.

Food Quality and Human Health

The popularity of locally grown food has increased (Onozaka and McFadden, 2011). This growth can be seen as a consumer response to market conduct in the global food system. Recent episodes of high profile food contamination incidents (ie BSE) have had an impact on consumer perception and confidence in food safety, since contaminations were traced to foreign
sources (Myae et al., 2011; Onozaka and McFadden, 2011). For the same reason as consumers of organic foods, consumers of local food perceived local foods to be of better quality and/or to be safer than their conventional counterpart. However the empirical results on improved health from the consumption of locally produced foods and the reasoning were inconclusive at best (Cranfield et al., 2012; Onozaka et al., 2010; Myae et al., 2012).

**Ethical Buying and Socially Responsible**

Buying locally sourced foods has become closely related to ethical and social responsibility through food purchase decisions. Consumers that purchase locally sourced food experience a sense of positive fulfilment of satisfying ones ethical needs (Megicks et al., 2012). This sense of sustainable consumption is often achieved when consumers perceive their choice to buy local will reduce food miles, support local suppliers and retailers, and improve animal welfare (Megicks et al., 2012; Cranfield et al., 2012; McEachern et al., 2010; Pearson et al., 2011). Furthermore, consumers of locally produced food are often motivated from a distrust of corporations. Zepda and Deal (2009) note that local food shoppers perceive the industrialized food system with hollow concepts of trust and integrity. Consumers that purchase local food, through avenues such as farmers market, develop a direct relationship with farmers. Thilmany et al. (2008) found that local attributes tends to affect demand through enhancement of the trust between consumers and producers. Furthermore, through direct relations between farmer and consumer, farmers were found to exhibit willingness to reduce chemical inputs to meet consumers demand. That is, consumers may believe that food purchase through direct sources, rather than purchased through complex value chains, is a more effective means of influencing environmental quality (Thilmany et
al., 2008) and increase credibility about attribute claims (McEachern et al., 2012).

Another form of motivation associated with consumer choice of local foods, is the notion of social embeddedness (Winter, 2003; Garcia et al., 2012; Cranfield et al., 2012). Embeddedness refers to the social relationship between the consumers/producers of the local food system and the surrounding community on the basis of trust, familiarity, reciprocity and shared values (Diaz et al., 2012; McEachern et al., 2012). A consumer’s choice of local food is not only a function of intrinsic and extrinsic attributes, but also motivated by engagements with the farmers, producers and rural community. Lusk and Norwood (2009) found that extra utility could be obtained from the social satisfaction related to consuming foods (i.e. local food) with normative dimension. As such, the level of social embeddedness is reflected by consumer demand for product attributes related to the local community (i.e. freshness, economic, social and environmental benefits).

**Lifestyle and Habits**

Role of habits and lifestyle can also influence the perception and thus likelihood of purchasing locally produced foods. According to Zepeda and Deal (2009), local food buyers visited more venues (i.e. farmers market, or direct from farmers) than did conventional shoppers. Those with, or following a dietary restrictions, such as vegetarians or vegans, may also influence the likelihood of purchasing local food. Involvement with food is also a significant predictor of the likelihood of purchase of local foods. Cranfield et al. (2012) suggest that consumers who are involved with their food such as growing food at home and or preparing meals from basic food ingredients are much more likely to purchase locally than from conventionally produced
food. Other authors (Brown, 2003; Darby et al., 2008) came to similar conclusions, in that farm affiliation or influences of a farm connection could increase the likelihood of purchasing local.

Background in farming, raised on farm, or parents raised on farms have a nostalgia influence for food grown on farm (Brown, 2003). Thus a desire to support family farms is likely to positively influence the preference for local products. Although willingness to pay was found to be twice as large for direct market shoppers than grocery store shoppers, farm organizational issues have less influence on the preferences (Darby et al., 2008). Even if consumers convey strong preferences for farm affiliation, marketing this affiliation is not always receptive by the consumer. Darby et al. (2008) looked at the interacting effects between trust, and farm affiliation with large corporations. Their results suggested that consumers were suspicious of corporate marketing scheme that conveyed a farm affiliation in their product, in order to increase the corporate’s image of being trustworthy.

2.4.3 Summary

Studies (Selfa and Qazi, 2005; Thilmany et al., 2008; Cranfield et al., 2012; Zepeda and Deal, 2009; Mesias et al., 2012) have found that socio-demographic variables are weak and inconclusive in explaining consumers perception and purchase intentions towards local food. Darby et al. (2008); Brown (2003) and Cranfield et al. (2012) suggested that food involvement in the form of cooking with basic food ingredients and farm affiliation were better predictors of purchase drivers for local food. However, socio-demographics may not directly have a significant influence on likelihood of purchase, it may indirectly influence food involvement. For example, household with young children may more frequently be involved with their food
than other household with out children, to ensure higher quality of food. Another example, of the pragmatic consumer living in the urban city may value time higher and therefore time constraint may limit his or her food involvement. Thus the likelihood of purchasing local food is lower. The same aforementioned studies have also found that willingness-to-pay (henceforth WTP) for local food is often higher than WTP for organic food. However, in the context of seasonality, it is not known whether this premium for local food fluctuates with on and off seasons. The seasonality is particularly significant in the Canadian context, since the growing season for local food is dictated by the short growing seasons and longer winter times. Furthermore, it is also unclear whether consumers view greenhouse produce as locally produced despite the larger environmental impact from this kind of growing technique.

2.5 Differentiating Organic From Local Foods

Organically produced foods began as an alternative to industrial agriculture (Adams and Salois, 2010). It was a consumer movement in response to the growing size and complexity of the North American agro-food system (Selfa and Qazi, 2005). Early advocates of organic foods often related to concepts similar with local food movements: concerns over food, nutrition and the environment, social and ecological costs of globalized food system. However, many argue that current organic food systems suffer with the very same problems that it stood against: conventionalization and branching of the sector (Adams and Salois, 2005; Onozaka and McFadden, 2011; Thimany et al., 2008). After the introduction of the US federal organic rule in 1990 (USDA adoption of a national standards) Adams and Salois (2005) observed that organic food lost its essential nature as an alternative to industrial
agriculture. Many consumers have turned to local food as a more holistic and authentic substitute for organics. For example, Loureiro and Hine (2002) found that WTP for local food is higher than organic food in Colorado, and the average WTP is 9.37 percent more for local than 6.64 percent more for organics. Onozaka and McFadden (2011) observed similar trends, with the increase in popularity of local foods as a response to growing distrust of the global food system. Episodes of high profile food contamination incidents traced to foreign sources (Muller, 2007; Onozaka and McFadden, 2011), concerns for global climate change, and carbon footprint contributed to the perception that global organic food system is not environmental friendly and sustainable.

This shift in preference and WTP from organic to local illustrates two points. The first implication is that the consumer segments for organics food and local foods share the same or very similar preferences for claims related to product quality, safety, and sustainability. If drivers for organics and local foods can be broadly defined to pertain naturalness, environment, fairness, sustainability, community food security, support for small farmers, then attributes that define organic and local food segment maybe mutually exclusive from conventional agriculture. The second implication is that the concept of local maybe more defensible than organic as a social movement (Adams and Salois, 2010). However, the current empirical evidence are at best ambiguous in supporting multiple ideas that local movement is a structural change in the demand, and/or a consumer novelty where demand surges during the increase in popularity of a fad.
2.5.1 Literature Gap in The Studies of Organic and Local Food

In an increasingly globalized food economy, fewer people are directly involved in producing food, while production chains are increasingly more complex. Knowledge about how food is grown or produced is quickly diminishing. The results of the drawbacks from our globalized and industrialized food systems have increased the geographical and cognitive distance between food producers and consumers. In this context, scholars (e.g. Onozaka et al., 2010; Self and Qazi, 2005; Yiridoe et al., 2005; Smithers et al., 2008) have investigated whether localized food systems have the capacity to reestablish this producer consumer relationship while generating economic, environmental and social benefits (Milestad et al., 2010). Benefits that accrue with farmers include the possibility for improved economic viability and to contribute directly in the local community (Milestad et al., 2010; Smithers et al., 2008). For consumers, benefits accrue in the form of increased knowledge about the food origin, access to fresher and authentic food.

However, a local food network is not a homogeneous entity, it is fluid, and constructed around the notions of consumerism, food activism, quality (Grunert, 2005), place (Smithers, 2008) and social embeddedness (Sonnino, 2007). On the notion of place, previous studies by Qazi and Sefla (2005) and Milestad et al. (2010) recognized that producers in the local food networks are not just operating within an encapsulated area. The binary treatment of local and organic as discrete variables is problematic, as these two networks are linked together in an overall food system. Milestad et al. (2010) observed that consumes often automatically associate organic foods with alternative agriculture and local food movement, and the distinction between organic
and local is not clearly understood.

Selfa and Qazi (2005) examined how producers and consumers conceptualize the construct of local and locally produced foods. In their analysis, spatial, social, and food quality were identified as variables that influence the producers and consumers perception of a local food system. Their study have demonstrated that variability exists in what constitute as local food systems for producers and consumers. However, it is not clear as to how the notion of location and geographic distances play on the perception of local and organic food. Also, to what extent does location and distances factor in the willingness to pay.

In order to differentiate the quality cues of organic and locally produced foods, it is imperative to investigate the characteristics of the food system in which the food was distributed and the size of the chain. To put this in context, the extent to which different marketing channels - for example, farmers market, local independent grocers, provincial-wide supermarkets and national-wide supermarkets interact with the purchasing decisions of organic and/or local food consumer is unknown. It is unclear if a role exists for farms that are small and medium sized to cooperate with larger national chains, and to what extent do processors or wholesalers play in a local food system. How would such incorporation of smaller to medium farm with larger national chains influence a consumers’ perception of local food? From this perception, how will it influence the purchase decision for local food, organic food and organic/local food?

2.6 Summary

On the basis of the literature review, the objective of this study is to assess the influence of the geographic distances (between the location of produc-
tion to the destination of consumption), characteristics of the production process, type of distribution channels, and price have on consumers’ demand for organic and/or local foods. When studies have examined the definition of local food, consumers and producers have had a different outlook on the definition (Grebitus et al., 2013; Adams and Salois, 2010; Smithers et al., 2008). For example, attributes such as freshness, taste, and quality were important to the consumers definition of local food, while these attributes were not identified by the producers (Sefa and Qazi, 2004). In this respect, it is hypothesized that consumer’s opinion of food quality has an influence on their food choice either directly or indirectly through their choice which is reflected by the type distribution channel the consumers decide to purchase their product from. This choice in distribution channel in turn should resonate with the consumers perception of what organic and or local food is and the different channels are defined by their relative distances from production to the destination of consumption.

Perhaps the most important factor in the food purchase decision making process is the consideration of quality (Grunert, 2005) and the perception of quality (Cranfield et al., 2012; Yiridoe et al., 2005; Voon et al., 2011). In this context, organic food and local food are often perceived to have superior quality over the conventional counterpart in the attribute space of health and nutritional benefits, food safety, social, and environmental benefits (Van Loo et al., 2012; Zepeda and Deal, 2009; Yiridoe et al., 2005; Thilmany et al., 2008). Results from previous studies suggest that the segment of consumers that value food quality should be more likely to purchase either organic food, local food or local organic food. To relate this notion of quality to proximity, Smithers et al. (2008) found that consumers assigned a greater importance for organic and/or local foods to adopt a wider geographical definition of
local. What Smiters et al. (2008) observed could potentially be explained by the necessity of trade-offs between proximity and the desire to obtain food products with certain specific desired attributes. In this respect, it is hypothesized that the willingness to pay (premium) for food products (local, organic, and local organic food) is related to the distribution channel which is defined as (local, regional, provincial, and national) and by the geographic proximity measured in distances. If the typical consumer perceive conventional foods as lower in quality than their organic and/or local counterpart, while the type of distribution channel often determines the source of food types, then it is suspected that willingness to pay would increase as the distances between the location of production to the destination of consumption decreases, subject to the different types of distribution channel.
Chapter 3

Primer on Stated Preference Methods and Conceptual Framework

3.1 Introduction

This chapter begins with the conceptual framework on choice and decision making, followed by discussion on preferences and stated preference methods. Three economic theories will be discussed and formulated together as the theoretical foundations of the conceptual model used in this thesis.

3.2 Conceptual Framework on Choice

Everyday, people are faced with the decision of choosing. Choices are made either consciously or sub-consciously and are expressed by choosing to support one outcome while rejecting other possible outcomes or alternatives. The observed outcome of choice may be trivial to the choice maker, how-
ever, it is not so for the analyst that is trying to explain the choice outcome through data (be it survey data or market data). The challenge here is the inability to fully explain the choice outcome through the use of captured data, since such data cannot contain all the information required to fully explain the choice outcome (Louviere et al., 2000). The inability of observed data to contain all the necessary information underlying choice is attributed to the temporal nature and heterogeneity of choice outcome.

According to Louviere et al., (2000) and Hensher et al., (2005), individuals’ choices are influenced by external factors such as habit, experience, peer pressure, environmental constraints, advertising, etc. These external factors are never static and are changing over time, for example the media and advertisement is constantly changing themes to promote the latest trend or fashion and what was popular yesterday maybe different tomorrow. This temporal nature of external factors, in turn, influences temporal changes in the choices individuals’ make, thus what was referred as temporal nature in choice outcome refers to the non-static non-linear in the choices made by an individual. It may seem intuitive that choice outcomes change over time in response to changes in taste and external influences, however the temporal nature of choice outcome has an important implication to the choice analyst. The temporal nature of choice outcome limits the choice analyst to only having access to data that captures information at a specific time and place, thus inferences proposed from the static results have limited explanation power that can weakly predict future choice outcome.

The other limitation raised by Louviere et al., (2000) and Hensher et al., (2005) is the problem of heterogeneity in choice. This problem would not persist if individuals’ choice could be represented by a single observed outcome and results elicited from one source could be used to explain choices
at the population level. However, this is not the case and the reality is there is a great deal of variability when we expand the underlying reasoning of decisions from the individuals to the population level. If the choice analyst was not bounded by finite resources, one could technically survey each and every individual within a population and elicit each choice outcome to derive results without any heterogeneity problem. Unfortunately, the choice analyst is faced with limited resources, thus it is more reasonable to survey a representative portion of the population in order to derive the reasoning for the underlying decisions of a choice outcome. This implies that the choice analyst will collect observed heterogeneity directly from the sampled sources and also a set of unobserved heterogeneity from the rest of the population that was not sampled. The main task of the analyst is to not only capture explanatory power from the observed heterogeneity but to also account for the explanatory power from the unobserved heterogeneity. According to Adamowicz et al. (1998), Louviere et al., (2000), and Hensher et al., (2005) the unobserved component can be captured through the use of random utility theory.

Although there are weaknesses to choice analysis in the form of limited information, such data is still relevant in explaining choice behaviour. The next section will present the conceptual framework on how preferences are formed, the relationship between preferences and utility and how choices are evaluated.

### 3.2.1 Decision Making and Preferences

Central to choice analysis lies the identification of factors that shape an individual’s preferences. More specifically, the statement “choices are influenced by external factor” is referring to the change in utility that is generated by
consuming a bundle of attributes. The conceptual framework of an individual’s decision process first begins with the initial awareness of a problem or need. After the initial awareness, the individual begins to either actively or passively learn about the products that pertains to their specific needs. As individuals’ continue to search and learn, their beliefs about certain products that will help attain their goal are formed (Louviere et al., 2000). As the individual becomes sufficiently informed about a product category, he or she will gain utility from experiencing the product and in the process involves the trade off between product attributes and product values. Given a set of prior beliefs and environmental constraints (such as income, location, etc) the individual develops a preference ordering for products. The decision to purchase between one or more alternatives (also to not purchase) is done by choosing the product that will maximize their satisfaction (utility).

Akin to Louviere et al. (2000) explanation on the decision making process is Grunert’s (2005) Total Food Quality Model. In this food model, Grunert (2005) derives two main axioms to explain how consumers’ derive their choice outcome based on the evaluation of food attributes. The first axiom is the horizontal dimension of perceived quality. According to Grunert (2005), perception of food quality are either experienced or derived from credence attributes. If the perception of quality is from past experience, then expectations about these qualities has either been confirmed or contradicted after the purchase. However, if the product is new, then perception of quality is derived from the credence attributes of the product and search experience and the search experience of the consumer. For the credence attribute, quality perception will still be based on inferences made from cues and most health related and process related qualities belong to this category of attributes (Grunert, 2005). The second axiom is the vertical dimension of

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means-end approach to consumer behaviour. According to Grunert (2005) this means-end approach postulates that consumers are interested in what the product is doing for them rather than interest in the physical product itself. This means a consumer’s choice outcome depends on the extent to which the consumer can link his or her perception of the product’s attribute to match their self-relevant values and consequences.

How do choice and utility relate to each other? According to Louviere et al. (2000; 2010), the foundations of choice analysis contains elements from the traditional theory microeconomic theory of consumer behaviour: rational choice and assumptions of preference theory. However, there were limited implications on an empirical standpoint that can be derived from traditional microeconomic theory of consumer behaviour (Loureiro and Umberger, 2007; Louviere et al. 2000).

Lancaster (1966) built upon the traditional theory to further suggest that utility is derived from the properties or characteristics inherent to the goods. That is, utilities for goods can be separated into different utilities for their attributes, component characteristics (Loureiro and Umberger, 2007) or what we can call ‘part worth’ utilities (Hensher et al., 2005). The motivation for incorporating random utility theory is to model after the component of consumer choice that is not observable by researchers (Louviere et al. 2005; Loureiro and Umberger, 2007; Hensher et al., 2005). Specifically, each choice alternatives generates some value of utility, but such utilities is composed of one part observable in the data (product attributes) and one part unobservable (heterogeneity and randomness of choices) to the researcher.

There are four properties of preferences that are important to choice analysis, (see Swait and Adamowicz, 2004). First, a large number of differentiated products are available, and the food demand is disaggregated food
characterized by the numerous substitutes for consumers to choose from. Second, choices on food products are dynamic, in the way that choices are reactive to new information and maybe influenced by habits. Third, a no-choice option is also present in the elements of choice behaviour (which is not provided for in a conjoint analysis). Fourth, food demands are characterized by heterogeneity in preferences. Given that discrete choice modelling has the computational power to measure these aspect of choice behaviour, it naturally leads this research into utilizing such framework.

3.3 Primer on Stated Preference Method

The traditional economic approach for evaluating preferences from individuals were based on revealed preference data (Louviere et al., 2010; Louviere et al., 2000). This class of data is collected from observing individuals’ behaviour in the real market. Recently, the use of revealed preference data has fallen in favour of stated preference theory and methods. In contrast to revealed preference data, stated preference data refers to choices that are made by considering a hypothetical situation. Stated preference data are often similar to the revealed preference data set, but describes a different degree of the same attributes observed in the real world market as well as additional unobservable attributes not collected from the actual markets (Hensher et al., 2005). Considering the latter benefits of stated preference data, such instrument can be useful when considering choices among existing and new alternatives. According to Louviere et al. (2000) and Hensher et al. (2005), the premise of stated preference data is consistent with economic theory where estimation can be performed on econometric models which are indistinguishable from their revealed preference data counterpart. The issue here is not about choosing either revealed preference data or stated
preference data, but whether models built around either type of data can produce result that are valid and reliable to make inferences about the real market behaviour.

Louviere et al. (2000) and Carlsson (2003) presents the following motivations as to why economists should be interested in stated choice methods:

- **Product innovation requires estimation of demand for new products with new attributes or features.** By definition, there are no revealed preference data available for managers to estimate the demand for a new product. This leaves managers with limited choices in either estimating such demand by employing data from a close substitute product. Stated preference data have often been used to address this need.

- **Revealed preference data carry little explanatory power in explaining variability in the marketplace.** It is not uncommon to observe products that have been in the market for many years, but such revealed preference data carry little to no variability in explanatory variables. Louviere et al. (2000) presented the example of European air fares in the 1970s to be static and remained unchanged for long periods. As such, revealed preference data could be accessible, however, the usefulness maybe of limited use for developing models on how behaviour change in response to changes in the market variables.

- **Goods that are not traded in the real economic markets, but are still valued in society.** Goods such as environmental goods and public goods are not listed and traded in the economic market. However, in some situations consumers exert efforts to consume such goods (e.g., value from preserving the wilderness of a remote forest or value of reducing
air pollution). Revealed preference data can sometimes be used as a close substitute to approximate the true interest value (e.g., travel cost method or hedonic valuation). In other situations, where revealed preference data does not exist to model the behaviour of interest (e.g., loss of prime agricultural land from urbanization), economists should use stated preference data and methods.

So far, we have seen some of the motivations for utilizing stated preference data, however it is not without weaknesses. Stated preference data represents the choices made under a given hypothetical situation. Sometimes such hypothetical situations may lead respondents to ignore personal constraints at the time of choice (Hensher et al., 2005). This situation is most relevant when the hypothesized stated preference task is not taken seriously by the subject. For example, Yue and Tong (2009) observed a hypothetical bias when consumers’ WTP is elicited using pictures instead of real products in hypothetical studies. The role of the analyst in designing the hypothetical situations is therefore to make the scenarios as realistic as possible.

Looking back at what revealed preference data presents us with, such data are constrained to provide the analyst with information on only current existing alternatives. As such, information on the attributes, and the levels of attributes are fixed within the boundaries of the current technological frontier (or what is currently available). Stated preference allows for the collection of data on attributes outside the ranges of revealed preferences. However, with stated preference experiments, the analyst must specify the attributes and attribute levels in advance (Hensher et al., 2005). By specifying attributes and levels of it in advance, this will allow the analyst to manipulate the relationships between attributes. Specific hypothesis can
then be tested for their functional form of demand or utility. One potential problem that may arise from pre-specifying attributes and attribute level, is to incorrectly specify or identify irrelevant attributes. The task of the analyst is therefore to identify the important attributes and attribute levels, since the choice outcome is then determined from these attributes and level.

3.4 Theoretical Foundation of Choice Behaviour

The stated preference method is used to assess the value of goods and the attributes of goods. Methods includes: conjoint analysis, contingent evaluation, and choice experiment. In this section and for the purpose of this thesis, stated choice experiments are used and so the limitations of stated choice methods will be discussed. In a stated choice experiment, the respondents are asked to choose their preferred alternatives in a given choice set. Note that while the information presented to the respondents is non-hypothetical, the basket of attributes that make up the alternative is hypothetical. The data generated belongs to the class of stated preference data. According to Carlsson (2003) and Holmes and Adamowicz (2003) choice experiments are more suitable when investigating the influence of food attributes on consumer behaviour.

The theoretical foundations of choice behaviour can be traced back to three relevant theories for eliciting preferences in a hypothetical context. The first theoretical foundation comes from Lancaster’s model of consumer demand, which postulates that consumers gain utility from the consumption of goods as a function of the commodity characteristics (Lancaster, 1966; Louviere et al., 2000). The second foundation is random utility theory which posits that individuals make choices to maximize their utility, and that utility is the sum of a systematic and a random component (Holmes
and Adamowicz, 2003). The last foundation is the combination of both previous theories together make up the framework for stated preference method (Carlsson, 2003; Holmes and Adamowicz, 2003). All together, these theories demonstrate how choices are derived by the product attributes and how such choices follow sound economic theory.

### 3.5 Empirical Model

In this section, three theories will be presented to help illustrate the derivation of the choice model used in this study. The first theory is Lancaster’s model of consumer demand, where utilities are generated from consumption of goods that embody attributes consumers value. The second theory is random utility model. The last theory incorporates random utility into Lancaster’s model.

#### 3.5.1 Theory of value

The traditional microeconomic theory for analyzing consumer demand and consumer choice has its theoretical roots in utility maximization using preference ordering, a budget constraint and a vector of prices of the goods (Louviere et al., 2000). This traditional theory presents a problem for the modern choice analyst, since this theory suggests that utility is generated from the good itself, failing to account for changes in utilities when the attributes of the good change. Under this classical theory, analysis of consumer demand is limited to the product attribute space - only the part-worth utility generated from the physical attributes of the product is recognized. Following the Lancaster demand model (1966, 1971) which builds on the traditional theory of consumer demand, consumer utility is derived from the properties of things or attributes which the goods possesses, rather than the
goods *per se* (Louviere et al., 2000). This new approach suggests that the quantity of goods consumed is not the source of utility, rather the good possesses attributes from where consumers derive utility. However each good is not limited to possessing only one attribute, and attributes are not unique to a single good. According to Louviere et al. (2000), the attributes that make up a good are assumed to hold a specific value for each attribute, and the summation of individual specific values is equal to the total value of the good. This assumption in Lancaster’s model implies that the relationship between the physical attributes of a good and utility is linear. For example, let vector $q$ be the total quantities of the goods to be consumed and vector $x_k$ is the observable utility from the relevant attributes. Thus $x$ is given as follows:

$$x_k = \beta_k q$$ (3.1)

$k$ is the attributes of the good, and $\beta_k$ is the vector of coefficients that are determined by $k$, where $k = 1, ..., K$. For example, if there are two attributes that defines the good $q$, then $k = 2$ and $x_k$ is defined on $k = 1, 2$. Lancaster then asserts that the model of utility maximization for an individual good can be stated as the following, if the individual posses a utility function of product attributes:

$$\text{maximize } U = U(x_k) = U(\beta_k q)$$ (3.2)

Subject to:

$$p'q \leq Y$$ (3.3)

With

$$q, x \geq 0$$ (3.4)
Where $p$ is a vector of prices and $Y$ is the individual’s income. The purpose of the linearity assumption is to simplify choice elicitation of consumer preferences. Note that utility here is assumed to be derivable from the components of attributes. Thus, each consumer, with their specific set of preferences for each product attribute will choose the best outcome based on the attributes that maximizes their utility, subject to their budget constraint.

Lancaster asserts that the relevant attributes should be defined on the properties of the good itself and on the services generated from the consumption of the good (Louviere et al., 2000). From this perspective, Lancaster’s model fails to acknowledge that differences may exist between consumers perception of objective attributes from the actual measure of utility based on the good’s attribute. Interest in consumer’s perception allows the choice analyst to evaluate how consumers will react to changes in prices or objective attributes in goods. Another criticism of Lancaster’s work is his assumption of a one-to-one correspondence between the perceived utility of consumption of a good, with a certain attribute to the observable value of the specific objective attribute (Louviere et al., 2000; Louviere et al., 2010). This implies that perceived utility is perfectly representative of the observed value of that specific objective attribute, which is often not true.

If individuals maximize utility based on their perception of the attributes of goods, then Lancaster’s approach to measure objective properties of commodities may not be appropriate here. Given the criticisms, Louviere et al. (2000) proposes the following modification as departures from Lancaster’s model: a different derivation of utility based on the consumption of the services provided by the commodity. Thus the modified approach is to treat the derivation of utility by assuming that individuals consume the services provided by the commodity and not from consuming the product itself (Lou-
viere et al., 2000). Furthermore, it should be assumed that individuals are consuming the commodity for the expected services provided by the attributes associated with the product. Given this modification, utility can be redefined as a function of the expectation of consuming the level of services provided by all the attributes grouped together to define the commodity (Louviere et al., 2000). The last modification to Lancaster’s model is to incorporate an error term.

The reason for including the error term is to represent the constraint that the choice analyst face. As a reminder, the choice analyst is unable to observe the choice outcome with the mobilization of the full knowledge that is hidden within an individual’s mind. Therefore, the analyst does not have access to the same amount of information used by the consumer when purchase decisions are made. Hence, inclusion of the error term allows the analyst to take account of what is observable, attributes of the product, and what is not observable. Extensions of this inclusion of error term can be traced back to Thurstone’s (1927) work on random utility theory and more recently McFadden (1974) which extends the theory to include multiple comparisons of choice alternatives.

### 3.5.2 Random Utility Theory

The complexity of explaining choice outcome has its root in the set of observable and set of unobservable influences on choice behaviour. This source of influence is referred by Hensher et al., (2005) as attributes that are sources of utility. Now, let $U_i$ represent the overall utility of an alternative, where $i$ refers to a specific alternative. The overall utility associated with the $i$th alternative is composed of the observed and unobserved part-worth utility. To denote those two types of part-worth or relative utility, let $V_i$ represent
the observed part-worth and $\epsilon_i$ represent the unobserved part-worth. Note that the relationship between $V_i$ and $\epsilon_i$ is commonly assumed to be independent and additive according to Hensher et al, (2005). Thus the overall utility of the $i$th alternative is given by:

$$U_i = V_i + \epsilon_i$$ (3.5)

As an aside, under the old Lancastrian consumer theory (Lancaster, 1966; Loureiro and Umberger, 2007), the choice outcome is based on the alternative that generates the highest amount of utility for the consumer. However, Lancaster’s view of utility is strictly derived from product attributes only (Onayngo, 2007) and thus $\epsilon_i$ does not exist. As for the framework of this thesis, utility depends on more than just the product attribute space, but also on consumers’ personal attributes (for example: taste, and social context). Therefore $\epsilon_i$ is a critical component in the measurement of utility.

More specifically the inclusion of $\epsilon_i$ is called the random utility choice framework. The premise is that individuals will act rationally and always choose what they believe to be the best outcome (Loureiro and Umberger, 2007; Lusk and Schroeder, 2004). The consumer is assumed to have a well behaved utility function (Onayngo, 2007; Varian, 1992) and the ability to select the alternative that yields the highest utility by comparing and ranking the bundles of alternatives. That is, the ordering of preference is based on selecting those bundles that provides more utility. Then $V_i$ can be redefined as the highest obtainable part-worth utility from amongst all other possible alternatives. $\epsilon_i$ can be defined as the random error component, unexplainable from the researchers point of view and it retains information on the unobservable factors that have an influence on the choice outcome. Consequently, this random error component is significant, since the true
part-worth remains unobservable to the researcher (Lusk and Schroeder, 2004; Loureiro and Umberger, 2007; Henser et al., 2005).

3.6 Summary

Recall that central to choice analysis is the identification of the influences that shapes the consumers’ specific set of preferences. To establish a choice outcome, the choice analyst must first identify the individual’s preferences for a specific alternative and any constraints that may hinder the amount of available alternatives. In this context, the choice outcome of an individual is established through a set of behavioural decision rule that is used to process all the information (for example: money, time, and the attributes of the alternative). However, the full knowledge of an individual’s choice is not observable by the choice analyst. Furthermore, when the choice analyst were to expand beyond explaining an individual’s choice to explaining a sample or population’s choice outcome, then large amount of variation in the reasoning that underlies the same choice outcome becomes much more complex.
Chapter 4

Empirical Framework on Choice Experimental Analysis

4.1 Introduction

In this chapter the empirical model will be extended to incorporate the random utility theory, followed by the survey tools and methods used to elicit preferences for organic and locally produced foods, and then a discussion of how the survey and empirical model were conducted.

4.2 Empirical Framework

Choice experiments are often derived under random utility theory (McFadden and Train 2000; Louviere et al., 2010; Louviere et al., 2000; Hensher et al., 2005). Random utility theory proposes that for each consumer, there is a latent utility for each choice alternatives (Louviere et al., 2010). The
utility is termed latent because it cannot be observed by the choice analyst. Nonetheless, utility can be deconstructed into two components: a systematic and a random component. To put this in context, random utility theory establishes a way of handling the unobserved information hidden in $\epsilon_n$ for each individual $n$. The systematic component is observable to the choice analyst, and can be used in explaining differences in choice alternatives (Hensher et al., 2005) and covariates in individual choices (Louviere et al., 2010; Louviere et al., 2000). The random component consists of all other unidentifiable factors that have an impact on choice. To develop the random utility model, assume the rational individual $n$, faces a choice among $j = 1, \ldots, J$ alternatives. If the individual obtains a level of utility from each alternative, then the utility of individual $n$ with the chosen alternative $j$ is denoted as:

$$U_{nj} = V_{nj} + \epsilon_{nj}$$

(4.1)

Where $U_{nj}$ is the unobservable utility that individual $n$ associates with choice alternative $j$, $V_{nj}$ is the observable systematic component of the individual $n$’s utility, determined by alternative $j$, and $\epsilon_{nj}$ is the unobservable random component that captures non-systematic factors.

If we assume that the individual operates with a utility maximizing behaviour, then such individual will choose an alternative that will generate the highest level of utility from amongst all possible alternatives. That is, alternative $j$ will be selected over alternative $k$, from amongst $J$ alternatives, when alternative $j$ provides the highest utility for the $n$th individual: $U_{nj} > U_{nk}$ for all $k \neq j$. Note the inability of the choice analyst to capture all the information inside the ”head” of the individual decision maker makes it difficult to predict the most preferred alternative. This means the
choice analyst can only make predictions based on that which they can observe. The probability, $P_{nj}$, that individual $n$ will choose alternative $j$ can be expressed as:

$$P_{nj} = Prob\{U_{nj} - U_{nk} > 0\}$$  \hspace{1cm} (4.2)

$$P_{nj} = Prob\{(V_{nj} + \epsilon_{nj}) \geq (V_{nk} + \epsilon_{nk})\}$$  \hspace{1cm} (4.3)

$$P_{nj} = Prob\{ (\epsilon_{nj} - \epsilon_{nk}) \leq (V_{nj} - V_{nk}) \}$$  \hspace{1cm} (4.4)

where $k = 1, 2, \ldots, J$ and $\forall k \neq j$. In other words, equation 4.4 suggest the probability that $n$th individual will choose alternative $j$ is equal to the probability that the differences between random component (unobserved sources of utility) of alternative $j$ compared to $k$ is less than or equal to the differences between the systematic utility component (observed sources of utility) of alternative $j$ compared to $k$ after evaluating all alternatives within choice set of $J$.

To make this model operational, the unobserved component $\epsilon_{nj}$ now needs a definition. If we recognize that some amount of utility associated with a specific alternative per individual is captured through the unobserved component then, according to Hensher et al., (2005), across the sampled population, there will exist a distribution of the random unobserved sources of utility. Prior to discussing what functional form this distribution may take, it is important to state two basic assumptions. The first assumption is that the random, unobserved utility component from each individual is located on some unknown distribution and is randomly allocated to each sampled individual (Hensher et al., 2005; Swait and Adamowicz, 2004; Louviere et al., 2010; Louviere et al., 2000). The second assumption is the IID
condition "independently and identically distributed". Under the IID, each alternative holds their own unobservable utility component that is located on some unknown distribution. Each individual is assumed to randomly assign the location of the alternative within that distribution which defines the range of the utility. Furthermore, it is assumed that the set of random unobserved utility component are independent and identically distributed with no cross-correlated terms (Hensher et al., 2005; Swait and Adamowicz, 2004; Louviere et al., 2010; Louviere et al., 2000). The result of these specific assumptions allows the choice analyst to estimate the probabilities of choice outcomes based on the surveyed data.

For the choice analyst to derive any meaningful discussion on choice outcomes, it is imperative to identify key product attributes that influence choices. According to Louviere et al., (2000) and Hensher et al., (2005), the set of attributes that are observed and measured resides in the systematic component of utility $V_{nj}$ where each attribute is assigned a set of weights to reflect their relative contribution to the source of systematic utility. In its simplest form, the systematic component can be expressed as a linear, additive form of observed attributes for alternative $j$. For individual $n$ that is choosing alternative $j$ with $(f)$ as a generalized function form, then the systematic component of utility can be written as:

$$V_{nj} = \beta_0j + \beta_1x_{1j} + \beta_2x_{2j} + \ldots \beta_zx_{zj}$$  \hspace{1cm} (4.5)

$\beta_0j$ is a parameter called the alternative-specific constant, that has no association with any of the other observed and measured attributes (more discussion will take place in the next chapter). There are $z = 1, \ldots, Z$ attributes and $\beta_z$ is the weight or parameters for each attribute $z$. Here, $x_{zj}$ is the explanatory variables or product attributes obtained by the $n$th indi-
individual from choosing the $j$th alternative. The choice analyst has the role of hypothesizing and determining the set of explanatory variables that will best fit the choice model. The next section will discuss the chosen specification of the choice model used in this study.

4.2.1 Model specification

Discrete choice theory postulates that the probability of choosing a good given a specified set of alternatives, is determined by the utility individuals receive from the good’s attribute. Through choice experiments, the choice analyst can capture information regarding the variation in attributes, amongst the alternatives faced by the individual, as the individual choice. Looking back at Chapter 2’s literature review, the most prevalent types of choice model estimation used in the food choice analysis literature is the logit model.

While the two most commonly used probabilistic choice models are the multinomial logit and the multinomial probit models, Greene (2000) and Kropko (2008) explained that the logit model provides a more reliable empirical model for choice probabilities. The differences between the logit and probit models is in the distribution of the error term (the random component). According to Greene (2000) the error term in the multinomial logit model is independent and identically distributed with a type I extreme value distribution (also known as log Weibull distribution), while the error term in the multinomial probit model is not necessarily independent and is distributed with a multivariate normal distribution. Although the differences between logit and probit models may seem minor, Kropko (2008) explains that the differences in distribution has a large effect. In the multinomial logit model, the error term is bounded by an assumption of independence.
of irrelevant alternatives (IIA) (Hensher, et al., 2005; Louviere et al., 2000; Greene, 2000; Kropko, 2008). This IIA condition states that if a third (irrelevant) alternative is either dropped or added to the analysis it should not affect the individual’s evaluation of one alternative relative to another alternative. If IIA is violated, the estimated coefficients will be inconsistent and the model itself will be incorrectly specified. Conversely with the multinomial probit model, no such assumption like the IIA is asserted making the probit model less restrictive. However, the probit model is computationally more intensive and little evidence exists to suggest that the unrestricted nature of the probit model provides more accurate results (Kropko, 2008).

Furthermore, Kropko (2008) explained that under a laboratory condition simulation of the logit model provided more accurate point estimates for some models with high correlation than the probit model. On the basis of the multinomial logit model being analytically more convenient, providing better inference outputs of estimates of coefficients and minimal differences in the standard errors with the probit model, the multinomial logit model will be used in this research.

Two branches of the logit model are often used in choice analysis: one is the multinomial logit model and the second is the conditional logit model. Conceptually there are no differences between the two models. However, choosing either the multinomial or conditional will depend upon the explanatory variables used to explain the choice outcome. Both multinomial logit and conditional logit are used to analyze choice outcome chosen amongst a set of alternatives. According to Hoffman and Duncan (1988) and Holmes and Adamowicz (2003) the multinomial logit model uses the individual’s characteristics (e.g. income, age, education...etc) as explanatory variables with the focus on the individual as the unit of analysis. While the condi-
tional logit model focuses on the alternatives as unit of analysis and the attributes of those alternatives are used as explanatory variables. This means, that under the conditional logit model, choice outcomes are treated as a function of the attributes of the alternatives instead of the attributes of the individual that is making the choice.

Selecting the type of choice model for this study hinges on the two main questions in this study: the first, is what attributes do Canadians associate with when purchasing local food, organic food and locally produced organic foods? The second is to what degree do the identified attributes influence consumers purchasing decisions? Given the nature of this study that focuses on the product attributes, using the attributes of the alternatives as explanatory variables and minimal interest in using characteristics of the individual to explain choice outcomes, conditional logit model is the more appropriate model.

4.2.2 The conditional logit model

In this study, the conditional logit model (CL) was chosen to model choice behaviours of Canadian consumers who would purchase locally produced unprocessed foods. Although there are lots of similarities between the multinomial logit model (MNL) and the CL, it turns out CL is more flexible than the MNL. With the MNL model, the estimation measures the impact of observation-specific variables on the probability of individual $n$ selecting a discrete outcome from amongst $J$ set of alternatives. Since the covariates only vary across individuals but not across each choices in the MNL model, estimation will yield separate effects for each variable on each choice.

To make the CL model operational, the unobservable random component (also known as the error term $\epsilon_{nj}$) is assumed to be distributed as a type I
extreme value distribution (McFadden, 1974; Hoffman and Duncan, 1988) expressed as:

\[ f(\epsilon_{nj}) = e^{-e^{-\epsilon_{nj}}} \]  

Then the conditional logit model takes on the following expression if and only if the J alternatives are independent and identically distributed with the type I extreme value (Weibull) distribution for the \( n \)th individual selecting the \( j \)th alternative, (where \( V_{nj} \) is written in matrix notation):

\[ P(y_{nj} = j | x_{nj}) = \frac{e^{V_{nj}}}{\sum_{j} e^{V_{nj}}} = \frac{e^{\beta' x_j}}{\sum_{j} e^{\beta' x_j}} \]  

Where \( y_{nj} \) takes on the value of one when alternative \( j \) is chosen by the \( n \)th individual, otherwise it \( y_{nj} \) will take on the value of zero for all other alternatives. \( x_{nj} \) is a column vector of explanatory variables, particularly they are product attributes obtained from choosing alternative \( j \) from the \( n \)th individual. Note that the systematic components as proposed by McFadden (1974) are in terms of the attributes of the alternatives. The conditional logit model can be estimated using maximum likelihood, given by:

\[ \ln L = \sum_{n=1}^{N} \sum_{j=1}^{J} y_{nj} \log(P_{nj}) \]  

4.2.3 Estimating the willingness to pay

To estimate the relative importance of attributes, the choice analyst can evaluate the rate at which individuals are willing to trade off one unit of an attribute for an increase in another attribute. This marginal rate of substitution amongst the product attributes can be calculated as a ratio of two coefficients. By comparing the ratio of the marginal utility of attributes
and the marginal utility of price, the choice models measures this marginal rate of substitution as the measurement for willingness to pay (WTP). The marginal value of an attribute, or WTP, can be calculated by dividing the estimated coefficient of attribute $k$ by the estimated coefficient of price $p$. WTP is expressed as:

$$WTP_k = -\frac{\beta_k}{\beta_p}$$  \hspace{1cm} (4.9)

Here, $\beta_p$ is the estimated coefficient for the price of the alternative and $\beta_k$ is the estimated coefficient for attribute $k$. If an individual has a high WTP value for an attribute, this means he or she derives a greater utility from that attribute and the higher monetary value that the consumer places on the product.

### 4.3 The experimental and survey design

In this section, the choice experiment and the survey design will be discussed. The discussion will begin with the examination of the selected attributes and their respective levels. This is followed by discussion on the design of the choice experiment.

#### 4.3.1 Selecting the attribute and their respective level

In this study, there are five different choice experiments, one for each of the five different food products: red tomatoes; gala apples; pork tenderloin; whole wheat bread; and cheddar cheese. Red tomatoes and gala apples were chosen to represent the unprocessed food groups commonly bought in the Canadian diet and pork tenderloin, whole wheat bread, and cheddar cheese were selected to represent processed food groups. Each of the five products is
characterized by the same five attributes: production system, retail channel, total distance travelled from point of production to point of consumption at the home, and price, as presented in Chapter 3. Although there are five different food products designed, this study will only focus on examining the unprocessed food groups. Examining previous literature, there seems to be no common consensus on how to vary the level of each attributes of the unprocessed food products. This is particularly problematic for the price attribute, since incorrectly listing the price levels may induce the wrong behavioural pattern in consumers that may lead to biased interpretations. That said, since there are no guidelines on which price levels should be invoked, the author opted to survey the food market in Guelph, Ontario, Canada for the average prices listed in that city as baseline levels. The four attributes and their different levels are presented in the following tables.

Looking at Table 4.1, the only difference between the two choice experiment is the price levels, while the rest of the attributes share the same levels. The production system attribute is presented with three levels: conventionally produced; grown organically, but not certified; and certified organic. The production system attribute captures how consumers value different production techniques for different types of foods. Note that the indicator for local production was purposely not included as a level in the production system attribute, that is because "localness" is captured in the distance variable. The decision to capture "localness" through the distance attribute allows for the consumer to express their perception of local food in terms of a continuous variable, rather than prescribing a standardized definition of local food. The continuity nature of the distance attribute should reflect the heterogeneous nature of the definition of local food. The retail channel attribute consist of four levels: farm direct; independent super-
<table>
<thead>
<tr>
<th>Attributes</th>
<th>Levels of attribute</th>
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<tbody>
<tr>
<td>Production system</td>
<td>Conventionally produced</td>
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<td></td>
<td>Grown organically, but not certified</td>
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<td></td>
<td>Certified organic</td>
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<tr>
<td>Retail channel</td>
<td>Farm direct</td>
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<td></td>
<td>Independent supermarkets</td>
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<td></td>
<td>Province-wide supermarket chains</td>
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<td></td>
<td>Nation-wide supermarket chains</td>
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<tr>
<td>Total distance travelled by the food product</td>
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<td></td>
<td>50Km</td>
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<td></td>
<td>100Km</td>
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<td></td>
<td>1000Km</td>
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<tr>
<td>Prices in Red Tomato CE ($/Kg)</td>
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<tr>
<td></td>
<td>$1.20</td>
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<td></td>
<td>$1.61</td>
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<td></td>
<td>$2.41</td>
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<tr>
<td>Prices in Gala Apple CE ($/Kg)</td>
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<tr>
<td></td>
<td>$1.31</td>
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<td>$1.51</td>
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markets; province-wide supermarket chains; and nation-wide supermarket chains. The purpose of the retail channel attribute is to examine the effects of location or venue on the purchase decision for organic food, local food and locally produced organic foods. Price levels for red tomatoes were calculated based on the average prices of red tomatoes in the city of Guelph, Ontario, Canada, then scaling the base average price by 50%, 100%, and 1000% yields the price levels of: $0.80; $1.20; $1.61; and $2.41. The prices were collected between January 14th to 19th, 2013 from Walmart, Nofrils, Foodbasics, Market Fresh and Metro. Since the demographics in Guelph, Ontario, Canada, resembles a typical city in Canada, the prices found in Guelph should be a close representative at the national level (CBC, 2007). The price levels for gala apples was calculated and scaled the same way as with the red tomato choice experiments with the levels: $0.75; $1.31; $1.51; and $2.26. The purpose of scaling up the baseline average price is to reflect the higher premiums associated with food products such as organically produced or locally produced since these products often require higher cost of production.

4.3.2 D-optimal design and choice set generation

One of the fundamental part of the choice analysis is the design of the experiment. To ensure the choice experiments are efficiently designed, choice analyst often prefer to use an orthogonal factorial design. When a linear model is implemented with an orthogonal design, the estimated parameters will be uncorrelated, independent from the other variables in the model and the variance of the estimated coefficients will be minimized. According to Kuhfeld et al., (2010) the efficiency of an experimental design can be quantified as a function of variance and covariances of the estimated param-
eters. As the variance decreases, the efficiency of the designed experiment increases. Although the function of an orthogonal design is to minimize variance of the estimated parameters, Kuhfeld et al., (2010) suggested that orthogonality is not the primary goal of the design creation. Orthogonal designs are not always available, especially when there are complicated or nonstandard number of combinations of factor levels involved. In those situations, a nonorthogonal design is required. Orthogonality is an important consideration, but the primary goal of the design is to minimize the amount of variance in the estimated parameters, while considering other factors. To make the design process operational, there are two critical assumptions that must be considered. The first assumption is that the more efficient the design will generate better part worth utilities, which leads to better estimates of product utilities and market shares. Thus estimates from a more efficient design will produce more accurate and reliable results than estimates from a less efficient design. Although discrete choice models are non-linear, the second assumption states that an efficient design for a linear model is equally a sufficient fit in design for the multinomial or conditional logit model used in a choice experiment.

The choice experiment in this study used a D-optimal design developed using the Macro procedures in SAS software. A number of studies have used D-efficiency as the criterion for choosing the appropriate design for choice experiments involving foods (e.g Innes and Hobbs, 2011; Onozaka and McFadden, 2011; Lusk, 2011; and Loureiro and Umberger, 2007). In a D-optimal design, the determinant of the information matrix is maximized ([X'X]), and the attributes are nearly balanced and orthogonal. To measure the efficiency of the design, D-efficiency is used as the criterion. D-efficiency scales from 0 to 100, where a D-efficiency score of 100 means the
design is orthogonally balanced and the variance of the estimated coefficients \(([X'X]^{-1})\) is minimized. The experimental design process started with the \%MktRuns macro to determine the size for the candidate design, followed by the \%MktEx macro to create the candidate design (set of alternatives). Then \%ChoicEff macro is used to find the most efficient choice design from amongst the set of alternatives, where the starting point was determined by a random seed.\(^1\)

The choice set design was created as a full factorial design that contained four attributes: with one three-level factor and three four-level factors. The full factorial design contained 192 possible combinations of alternatives \((3 \times 4^3)\) and with two alternatives available, this amounts to 96 possible choice sets. It is important to note that in the full factorial design, all main effects and specific two-way interaction factors are uncorrelated and estimable. However, subjecting the respondent to all 96 choice set imposes a response burden on respondents and is often impractical due to time and cost constraints. For this reason, the \%MktBlock macro is used to minimize the survey length by blocking the choice design to only show a small block of the full factorial set, while still collecting sufficient data from each participant. The 96 possible choice sets were assigned to 12 blocks of randomized eight choice sets, with each choice set comprised of two alternatives and a third ‘no-choice’ option. The final results with the above specification (The SAS final results output can be reviewed in Table 4.2: SAS Final Result Output) yielded a D-efficiency score of 65.3379. While the D-efficiency score may not be high, the blocking of a full factorial design and a large sample size (2000 observations) should compensate for the low D-efficiency score. Although there was a total of 2000 completed surveys, it should be noted that the

\(^1\)The full SAS coding and design results is available in Appendix A
full 2000 sample encompass five different version of the survey to reflect the five different food products. Thus for each of the five survey, there are 400 observations per choice experiment.

<table>
<thead>
<tr>
<th>Final results for choice design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice sets</td>
</tr>
<tr>
<td>Alternatives</td>
</tr>
<tr>
<td>D-efficiency</td>
</tr>
<tr>
<td>Relative D-efficiency</td>
</tr>
<tr>
<td>D-Error</td>
</tr>
</tbody>
</table>

A reminder that this study focuses its investigation on the two fresh produce: red tomatoes and gala apples. This translate into designing two choice experiments and each of the two experiment will be treated with their own choice design and survey. Both choice experiments will have the same choice set design, and D-efficiency score, and the only difference between the two designs is the treatment of the price attribute and which product is assigned to the respondents. Each respondent was randomly assigned on to one of the five different food product groups, then allocated to one of the 12 blocks of eight choice sets until each of the five groups has satisfied a quota of 400 respondents. From the eight choice sets, the respondents were asked whether they prefer product one, product two, or would purchase either product one or product two.

'No-choice’ option

The choice experiment was designed to include a 'no-choice’ alternative, which allows the respondent the opportunity to choose "to purchase either alternative one or two” in the choice set. The advantage of including a 'no-choice’ alternative according to Haaijer et al. (2001) and Hensher et
al.(2005) is to make the choice decision more realistic thus resulting in better predictions of market penetration. There are couple of hypothesis on when a respondent would choose the ‘no-choice’ alternatives. When none of the available alternatives appears to be attractive, or when the respondents expects to find better alternatives the more likely he or she would choose the ‘no-choice’ alternative. Moreover, when the respondents are unsure about the other possible range of alternatives, they may choose the ‘no-choice’ alternative to continue their search for a better alternative in the early stages of a choice process. Interestingly Haaijer et al., (2001) suggested that if two alternatives are equally attractive to the respondent, the preferences for the ‘no-choice’ alternative increases. This observation implies that respondents will choose to purchase neither when both alternatives are close in preferences and suggests that people have the tendency to avoid difficult choices. If this tendency in people to avoid difficult choices is true, then such results may lead to biased estimations in the coefficients of the interested attributes. By not including the ‘no-choice’ alternative, the respondents are forced into making a choice and trading off between the available combinations of attribute levels. This coercion could lead to biased estimations of attributes, if the author were to hypothesize the wrong set of attributes that the consumers value in organic and local food products. By including the ‘no-choice’ alternative, the respondents were provided with the opportunity to express the set of attributes provided had no explanatory power or the provided levels of the attributes were unrealistic. The results from choosing the ‘no-choice’ alternative maybe an indication for the choice analyst as to the overall performance of the selected attributes. From a modelling perspective, Haaijer et al., (2001) and Hensher et al., (2005) suggest that the ‘no-choice’ alternative be coded as a series of zeros since its fixed part of
utility is equal to zero and add an alternative specific constant to represent the additional ‘no-choice’ parameter.

4.3.3 Survey design and structure

The survey was created and distributed online through a third party company: IPSOS. This ensured that there were 2000 completed surveys split amongst five different versions and survey responses did not have missing data. The structure of the survey can be decomposed into five main sections: (1) screener questions; (2) questions related to respondents knowledge and perceptions on organic foods; (3) questions related to respondents knowledge and perceptions on local foods; (4) the choice experiment questions; and (5) socio-demographic questions. Questions that involved a statement were coded to randomized the order of appearance in order to minimize the order-effect. The full survey is available in Appendix A.

The first section of the survey was designed to screen out respondents that were not in our sample frame. For example, respondents from Nunavut or Yukon were screened out since the relative population size of those two provinces are small and negligible. Respondents with occupations in agricultural production and/or the food industry could lead to biased responses, in order to sway or dismiss the results based on their work environment. Respondents who do not share grocery responsibility were also thanked and terminated from the survey.

The second section of the survey is designed to measure the respondents’ knowledge on the organic farm practices; production standards; and elicit their perception on organic foods. Respondents in this section were asked to indicate their level of agreement to 14 statements that each is related to a common psychometric attributes identified by previous literatures. Note
that some statements were purposely worded as a negative statement to ensure respondents are carefully analyzing each statements and also minimizing the order-effect. The last part of section two takes the food value scale developed by Lusk (2011) and requires the respondent to allocate points to the 12 "food values" they deemed most important for the a product to be organic. This allocation questions allow the consumers to express what they believe to be relatively more important when purchasing food that is organic.

Section three is similarly structured as section two, with 12 statements that requires indication of agreement and a food scale allocation but for locally produced foods. Subjecting respondents to the same food value scale allows identification of any differences in values that influence purchasing decisions between organic and locally produced foods. There are randomization and negative statements in section three as well, in order to motivate unbiased results and minimized order-effects.

Section four begins with a brief descriptive definitions of the attributes in order to provide some context prior to answering any of the choice questions. The order of the choice questions were randomized in order to limit the order-effects. The last section involves asking the respondents some socio-demographic variables such as gender, age, income, education and household size. These socio-demographic variables help identify if the survey responses is representative of the Canadian population.

### 4.4 Summary

In this chapter, the empirical model was presented and the random utility framework introduced. The conditional logit model was selected as the choice model, since this study is interested in estimating the effects of at-
tributes on the likelihood of purchasing a given alternative. That is, the consumers’ utility is evaluated on the chosen alternative with its specific set of attributes. The choice experiment was designed to elicit how attributes (price; distance; production system; and retail channel) affects consumers’ purchasing decision on local food products. The choice experiment follows a full factorial design that is blocked with the criterion of minimizing the variance between coefficients of the attributes. The efficiency of the design was measured by its D-efficiency score. Although the D-efficiency score was not exactly high, the blocking of the full factorial design and a large sample size should be sufficient to compensate the lower score. Finally the survey was designed to elicit valuable information on consumers perception on organic and local foods and also a vector for administrating the choice experiment questions.
Chapter 5

Empirical Results

5.1 Introduction

In this chapter, the results from the survey and the choice experiment will be presented. Presentation of the results will be broken down into three main sections. The first section will address the survey representativeness by comparing socio-economic and demographic variables against the general Canadian census collected by Statistics Canada. The second section will present the analysis of the influences of organic and local food choices. Results from this section should provide an outlook on Canadian respondents perception and knowledge on organic and local foods grown in Canada and be helpful in identifying any significant factors to consider when purchasing organic and local foods. The last section will present the results from the choice experiment and the estimated willingness to pay for the identified variables used in the conditional logit model. At the end of this chapter, key findings will be addressed and discussed.
5.2 Survey Representativeness

In this section, the survey sampling and data collection procedure will first be addressed. This is followed by an assessment on the data’s representativeness of the target population for all five surveys, and also individually for the red tomato and gala apple data. Key socio-economic and demographic variables will be used to describe the surveys representativeness as well as comparisons between the two surveys.

5.2.1 Distribution of the Survey

The survey and the choice experiment was conducted on the internet between March 2013 to April 2013. For the choice experiment there were five different designs to reflect the five food products to be investigated. The five food products are as follows: red tomato; gala apple; pork tenderloin; whole grain bread; and cheddar cheese. Each of the five choice experiments was differentiated from each other based on price and the product itself, otherwise all other attributes are the same. Respondents were randomly assigned to one choice experiment of the survey until the quota for each product’s survey was met. Note that this study focused its investigation on the non-processed fresh food products.

To facilitate the distribution of the survey and the choice experiment on the internet, Ipsos Marketing (Agriculture and Animal Health) was hired to assist with data collection. The involvement with Ipsos Marketing to distribute the survey on the internet guaranteed a 100 percent response rate for 2000 completed surveys. Amongst the 2000 completed surveys, 400 were allocated evenly across the five versions of the survey. This means each choice experiments will have 400 completed respondent data after dropping all observations that were screened out; abandoned; and or incomplete due
to the quota fulfilment. The fulfilment quota clause ensures that once a survey has reached its 400 completed quota, respondents that was matched to the full quota survey will be thanked and terminated.

5.2.2 Comparing the Survey Sample to the Canadian Population

Table 5.1 compares socio-demographic characteristics of the full survey, the sub sample for the red tomato CE, the sub sample for the gala apple CE with the general Canadian population (based on the 2011 Census of Canada). In all three samples (full survey; red tomato; and gala apple), the proportion of males to females were significantly under sampled compared to the population. Males were under sampled by roughly 60 to 70 percent in all three samples, and the proportion of females respondents were all above 80 percent. The low response rate from males could be due to the high likelihood that the female was responsible for most of the primary grocery shopping, and non primary grocery shoppers were screened out. This observation of under sampled male is often observed in other studies that had looked at organic and local food preferences (Lusk and Schroeder, 2004; Onozaka et al., 2010; Cranfield et al., 2012; Costanigro et al., 2011).

The distribution of regions in all three samples closely resembles that of the Canadian census. A larger proportion of the respondents are located in the higher population density provinces of British Columbia, Ontario and Quebec. For all three samples, Ontario had the highest concentrations of respondents at 40 percent followed by Quebec and British Columbia at roughly 20 to 21 percent and 14 to 16 percent respectively. Note that the respondents from New Brunswick, Newfoundland, Nova Scotia, and Prince Edward Island were aggregated together as the Atlantic region. Considering
<table>
<thead>
<tr>
<th>Table 5.1: Socio-Demographic Characteristics of the Survey Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socio-Demographics</strong></td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><strong>Region</strong></td>
</tr>
<tr>
<td>AB</td>
</tr>
<tr>
<td>BC</td>
</tr>
<tr>
<td>MN/SK</td>
</tr>
<tr>
<td>ON</td>
</tr>
<tr>
<td>QC</td>
</tr>
<tr>
<td>Atlantic</td>
</tr>
<tr>
<td><strong>Age Group</strong></td>
</tr>
<tr>
<td>18-24</td>
</tr>
<tr>
<td>25-34</td>
</tr>
<tr>
<td>35-44</td>
</tr>
<tr>
<td>45-54</td>
</tr>
<tr>
<td>55-64</td>
</tr>
<tr>
<td>65+</td>
</tr>
<tr>
<td><strong>Education</strong></td>
</tr>
<tr>
<td>Less than high school</td>
</tr>
<tr>
<td>High school graduate</td>
</tr>
<tr>
<td>College graduate</td>
</tr>
<tr>
<td>Some university</td>
</tr>
<tr>
<td>Undergraduate degree</td>
</tr>
<tr>
<td>Graduate degree</td>
</tr>
<tr>
<td><strong>Household Income</strong></td>
</tr>
<tr>
<td>Less than $10,000</td>
</tr>
<tr>
<td>$10,000-$19,999</td>
</tr>
<tr>
<td>$20,000-$29,999</td>
</tr>
<tr>
<td>$30,000-$39,999</td>
</tr>
<tr>
<td>$40,000-$49,999</td>
</tr>
<tr>
<td>$50,000-$59,999</td>
</tr>
<tr>
<td>$60,000-$69,999</td>
</tr>
<tr>
<td>$70,000-$79,999</td>
</tr>
<tr>
<td>$80,000-$89,999</td>
</tr>
<tr>
<td>$90,000-$99,999</td>
</tr>
<tr>
<td>$100,000-$124,999</td>
</tr>
<tr>
<td>$125,000-$149,999</td>
</tr>
<tr>
<td>$150,000 or more</td>
</tr>
<tr>
<td>Prefer not to answer</td>
</tr>
</tbody>
</table>
that there was only one to two percent of the respondents were from one of the Atlantic provinces, it is more convenient to represent those provinces together as one entity than as the individual provinces.

Descriptive results on the age groups of the three samples shows that the youngest aged group 18-24 were under sampled by eight percent when compared with the Canadian census. The average age groups (45-54 and 65+ aged groups) for the three samples were slightly higher than the Canadian census, but broadly speaking it is still representative of the Canadian population with plus or minus four percent difference. For the three samples, the average respondent age was 51, 50 and 52 respectively for the full sample, red tomato and gala apple choice experiments. This observation of a higher response rate from the age group between 45 to 65 is often observed in other choice experiments involving organic and local foods as well. Other studies such as Loureiro and Umberger (2007); Yue and Tong (2009); Costanigro et al. (2011) and Lusk(2011) have all found that the average respondent age to be between 45 to 60.

The education level for all three samples broadly resembles the Canadian census, with the exception of the tail ends of the distribution. Those with less than a high school education were under sampled while those with a graduate degree was almost three to four percent higher than the Canadian average. The average respondent with some university to a undergraduate degree was six to ten percent higher than the Canadian census. This observation of a higher average education is quite prevalent for internet based survey according to Shih and Fan (2009), who also suggest that educated respondents were more responsive to internet based surveys.

The distribution of the household incomes for all three samples were similar to those of the average Canadian population, however the low and
high end of the income distribution seems to be slightly under sampled. Note that within the 2000 completed surveys, almost 17 to 18 percent of the respondents preferred not to report their household income. This observation could may introduce some amount of deviation away from the sample representativeness of the Canadian census.

5.3 Influences on Organic and Local Food Choices

In this section, results from the psychographic questions will be presented in order to identify key factors that respondents perceive to be important when considering the purchase of organic and/or locally produced foods. First, a summary of the distribution channel in which the respondents frequent when purchasing their groceries is presented. The information on the distribution channels helps to identify which channels are more relevant when purchasing conventionally, organically, or locally produced food products. The next section will address key factors that the survey respondents relate to when deciding to purchase organic and locally produced foods.

5.3.1 Purchase Location

To capture information on which retail channels were visited by the respondents to purchase conventional, organic and locally produced foods, respondents were asked to indicate which store types they have visited to purchase conventionally produced foods, food that is labelled as organic or organically produced, and food that is labelled as locally produced. The nine retail channels are: large chain grocery store (for example Loblaw’s, Z hers, Dominion, Sobey’s, Safeway, Metro, and Maxi etc.); discounted grocery stores (for example Food Basics, No Frills, and Price Choppers etc.); independent grocery stores (for example Longo’s, Farm Boy, Highland Farms,
Bruno’s, Michael-Angelo’s, and Dennigers etc.; ethnic grocery stores; health food stores; mass merchandisers or discount department stores (for example Zellers, and Walmart etc.); warehouse club stores (for example Costco, and Sam’s Club); butcher shop; and farmers market. Note that respondents were asked to report once per category of conventional, organic, and local for the following nine retail venues. Thus the total frequencies in each of the food type category will be greater than 2000 but the percentage across the retail venues will be at 100 percent\(^1\). As shown in Table 5.2, the majority of respondents (86 percent) visit large chain grocery stores to purchase conventionally produced foods, followed by mass merchandisers or discount departments and warehouse club stores at 59 percent and 47 percent respectively. The sample of respondents that do purchase food labelled as organic and local was significantly less than those who purchase conventionally produced foods. Only 1,076 respondents indicated they purchased organic food, compared to 2,689 respondents that purchased conventionally produced foods. Similar results were observed for food labelled as locally produced. Amongst those respondents that had purchased organic foods, large chain grocery stores and health food stores were the most frequented store to purchase at 29.54 percent and 15.64 percent respectively. For those respondents that had purchased locally produced foods, farmers market and the butcher shop were the two most visited venue at 43.8 and 17.4 percent.

5.3.2 Food Values and Responses to Psychographic Questions

Respondents were asked a variety of psychographic questions related to their perception, knowledge, opinions, and attitudes towards purchasing food la-

\(^1\)When summing across each of the nine retail venue for conventional, organic and local, the percentage is at 100
Table 5.2: Distribution Channels Visited by the Respondents to Purchase Food Labelled as Conventional, Organic, and Local

<table>
<thead>
<tr>
<th>Distribution Channel</th>
<th>Conventional Foods No</th>
<th>Conventional Foods Yes</th>
<th>Food Labelled as Organic No</th>
<th>Food Labelled as Organic Yes</th>
<th>Food Labelled as Local No</th>
<th>Food Labelled as Local Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large chain grocery stores</td>
<td>13.39%</td>
<td>86.61%</td>
<td>70.46%</td>
<td>29.54%</td>
<td>63.7%</td>
<td>36.3%</td>
</tr>
<tr>
<td>Discounted grocery stores</td>
<td>52.19%</td>
<td>47.81%</td>
<td>92.12%</td>
<td>7.88%</td>
<td>85.98%</td>
<td>14.02%</td>
</tr>
<tr>
<td>Independent grocery stores</td>
<td>74.34%</td>
<td>25.66%</td>
<td>89.61%</td>
<td>10.39%</td>
<td>85.98%</td>
<td>14.02%</td>
</tr>
<tr>
<td>Ethnic grocery stores</td>
<td>82.48%</td>
<td>17.52%</td>
<td>94.37%</td>
<td>5.63%</td>
<td>94.49%</td>
<td>5.51%</td>
</tr>
<tr>
<td>Health food stores</td>
<td>89.24%</td>
<td>10.76%</td>
<td>84.36%</td>
<td>15.64%</td>
<td>92.74%</td>
<td>7.26%</td>
</tr>
<tr>
<td>Mass merchandiser</td>
<td>40.55%</td>
<td>59.45%</td>
<td>93.24%</td>
<td>6.76%</td>
<td>89.61%</td>
<td>10.39%</td>
</tr>
<tr>
<td>Warehouse club store</td>
<td>52.69%</td>
<td>47.31%</td>
<td>92.49%</td>
<td>7.88%</td>
<td>93.37%</td>
<td>6.63%</td>
</tr>
<tr>
<td>Butcher shop</td>
<td>77.47%</td>
<td>22.53%</td>
<td>92.12%</td>
<td>7.88%</td>
<td>82.6%</td>
<td>17.4%</td>
</tr>
<tr>
<td>Farmers market</td>
<td>83.23%</td>
<td>16.77%</td>
<td>83.6%</td>
<td>16.4%</td>
<td>56.2%</td>
<td>43.8%</td>
</tr>
</tbody>
</table>
belled as organic or local. According to Lusk (2011) the decision to purchase food that is organic and/or locally produced is significantly influenced by the individual’s food values. As such, the survey attempts to explore how Canadian respondents would weigh and value the eleven food attributes proposed by Lusk (2011). Respondents were asked to allocate 100 points amongst the eleven food values, where more points would be assigned to factors that the respondents deemed as more important. Table 5.3 reports the average score for organically produced foods and locally produced foods for each of the eleven factors in all three samples (full survey; red tomato; gala apple). For all three samples, the factors deemed most important to consider when purchasing organic and local foods were: price; taste; and freshness. The three least relevant factors considered by the respondents differed between organic and local foods. For the three samples, tradition was the least relevant food attribute considered by the respondents when choosing to purchase organically produced foods, followed by convenience and fairness. The least relevant food attributes considered by the respondents when choosing to purchase locally produced foods was tradition, fairness, and convenience.

Looking at the relative importance assigned to the top three attributes (price, taste and freshness), the distribution of the means between organically and locally produced foods is negligible. This suggests that respondents often look for the same food attributes (ie price, taste and freshness) when choosing to purchase organic and locally produced foods. It is possible that consumers lack the knowledge to differentiate between organic and locally produced, or consumers simply treat both food products to be substitutes goods from each other. Further research is required in order to address this observation. From the perspective of a local food producer, in order to differentiate locally produced from organic, local food should be marketed
through attributes other than price, taste and freshness in order to capture
the premium at the local food market.

5.3.3 Exploratory Factor Analysis of Factors Influencing Food
Choices

A series of psychographic questions were asked in order to explore any un-
derlying latent construct in the responses to the purchasing questions for
food labelled organic and local. Respondents were asked to indicate their
level of agreement on a five point scale towards twelve statements\(^2\), where
each statement addresses a dimension related to either organic or locally
produced foods. However, given the twelve proposed dimensions of psycho-
graphic variables may not all be relevant, the dimensions of the independent
variables can be reduced to better understand the latent factors that influ-
ence choices of organic and local food. Exploratory factor analysis was
used to reduce the dimensions and identify any underlying latent structure.

To determine the factorability of the psychographic questions, the Kaiser-
Meyer-Olkin measure of sampling adequacy (KMO) was used. The KMO
takes on the value from zero to one. If two dimensions share a common fac-
tor with other variables, their partial correlation will be small and the KMO
value will be closer to one, indicating a high degree of common variance. If
KMO values are small, then the variables share too little common ground to
warrant a factor analysis. According to Kaiser (1974), KMO value ranging
from zero to 0.59 is considered unacceptable and miserable; 0.60 to 0.79 is
mediocre to middling; and 0.80 to 1.00 is meritorious to marvellous.

To begin, refer to Table 5.4. The KMO test statistics on the opin-
ions about organically produced foods is 0.869, indicating a high degree of

\(^2\)The 5-point scale ranks from 1 = Strongly agree, to 5 = Strongly disagree
Table 5.3: Food Attributes Consumers Believed to be Important for Purchasing Organic and Locally Produced Foods

<table>
<thead>
<tr>
<th>Survey Sample</th>
<th>Organically Produced</th>
<th>Locally Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>Freshness</td>
<td>13.92</td>
<td>11.78</td>
</tr>
<tr>
<td>Taste</td>
<td>15.25</td>
<td>13.62</td>
</tr>
<tr>
<td>Price</td>
<td>24.00</td>
<td>22.47</td>
</tr>
<tr>
<td>Safety</td>
<td>10.00</td>
<td>11.63</td>
</tr>
<tr>
<td>Convenience</td>
<td>4.00</td>
<td>5.98</td>
</tr>
<tr>
<td>Nutritional Content</td>
<td>10.86</td>
<td>11.04</td>
</tr>
<tr>
<td>Tradition</td>
<td>3.41</td>
<td>7.36</td>
</tr>
<tr>
<td>Origin</td>
<td>9.61</td>
<td>11.69</td>
</tr>
<tr>
<td>Fairness</td>
<td>5.48</td>
<td>7.11</td>
</tr>
<tr>
<td>Appearance</td>
<td>6.93</td>
<td>7.57</td>
</tr>
<tr>
<td>Environmental Impact</td>
<td>8.09</td>
<td>10.02</td>
</tr>
<tr>
<td>Naturalness</td>
<td>7.75</td>
<td>11.07</td>
</tr>
</tbody>
</table>

Red Tomato CE

<table>
<thead>
<tr>
<th></th>
<th>Organically Produced</th>
<th>Locally Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>Freshness</td>
<td>14.01</td>
<td>11.80</td>
</tr>
<tr>
<td>Taste</td>
<td>15.29</td>
<td>13.68</td>
</tr>
<tr>
<td>Price</td>
<td>24.51</td>
<td>23.72</td>
</tr>
<tr>
<td>Safety</td>
<td>9.30</td>
<td>10.46</td>
</tr>
<tr>
<td>Convenience</td>
<td>3.77</td>
<td>4.41</td>
</tr>
<tr>
<td>Nutritional Content</td>
<td>10.62</td>
<td>11.58</td>
</tr>
<tr>
<td>Tradition</td>
<td>2.82</td>
<td>4.11</td>
</tr>
<tr>
<td>Origin</td>
<td>9.44</td>
<td>10.64</td>
</tr>
<tr>
<td>Fairness</td>
<td>5.98</td>
<td>10.10</td>
</tr>
<tr>
<td>Appearance</td>
<td>6.73</td>
<td>6.63</td>
</tr>
<tr>
<td>Environmental Impact</td>
<td>8.58</td>
<td>10.97</td>
</tr>
<tr>
<td>Naturalness</td>
<td>7.56</td>
<td>10.01</td>
</tr>
</tbody>
</table>

Gala Apple CE

<table>
<thead>
<tr>
<th></th>
<th>Organically Produced</th>
<th>Locally Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>Freshness</td>
<td>13.72</td>
<td>11.45</td>
</tr>
<tr>
<td>Taste</td>
<td>14.84</td>
<td>13.83</td>
</tr>
<tr>
<td>Price</td>
<td>24.00</td>
<td>22.50</td>
</tr>
<tr>
<td>Safety</td>
<td>9.91</td>
<td>12.00</td>
</tr>
<tr>
<td>Convenience</td>
<td>4.22</td>
<td>6.10</td>
</tr>
<tr>
<td>Nutritional Content</td>
<td>11.16</td>
<td>11.59</td>
</tr>
<tr>
<td>Tradition</td>
<td>3.88</td>
<td>9.33</td>
</tr>
<tr>
<td>Origin</td>
<td>9.36</td>
<td>13.10</td>
</tr>
<tr>
<td>Fairness</td>
<td>4.90</td>
<td>5.74</td>
</tr>
<tr>
<td>Appearance</td>
<td>7.16</td>
<td>8.44</td>
</tr>
<tr>
<td>Environmental Impact</td>
<td>7.66</td>
<td>8.93</td>
</tr>
<tr>
<td>Naturalness</td>
<td>7.58</td>
<td>10.81</td>
</tr>
</tbody>
</table>

a, b, and c denotes the attribute with highest mean respectively
x, y, and z denotes the attributes with lowest mean respectively

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Table 5.4: Factor Loadings From Exploratory Factor Analysis on the Opinions About Organically Produced Foods

<table>
<thead>
<tr>
<th>Item</th>
<th>Environmental and Quality Concerns From Buying Organic</th>
<th>Taste and Safety of Organic Foods</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic food is more nutritious than conventional food</td>
<td>0.762</td>
<td>0.029</td>
<td>0.037</td>
</tr>
<tr>
<td>Eating organic food will improve my overall health</td>
<td>0.749</td>
<td>0.214</td>
<td>-0.015</td>
</tr>
<tr>
<td>Buying organically produced foods helps to reduce my carbon footprint</td>
<td>0.657</td>
<td>0.227</td>
<td>-0.037</td>
</tr>
<tr>
<td>Buying organically produced foods helps to support my local community</td>
<td>0.683</td>
<td>0.170</td>
<td>-0.115</td>
</tr>
<tr>
<td>I eat organically produced foods because it supports environmentally sound farm practices</td>
<td>0.663</td>
<td>0.140</td>
<td>-0.281</td>
</tr>
<tr>
<td>Organically produced foods are fresher than conventionally produced foods</td>
<td>0.771</td>
<td>-0.017</td>
<td>-0.051</td>
</tr>
<tr>
<td>Organic foods are produced with the use of pesticides</td>
<td>0.053</td>
<td>0.708</td>
<td>0.288</td>
</tr>
<tr>
<td>Organically produced foods taste worse than conventionally produced foods</td>
<td>0.171</td>
<td>0.677</td>
<td>-0.187</td>
</tr>
<tr>
<td>The environmental impact of buying organically produced foods is higher than conventionally produced foods</td>
<td>-0.181</td>
<td>0.540</td>
<td>-0.262</td>
</tr>
<tr>
<td>There is a lower risk of exposure to pesticide contamination in organic food</td>
<td>0.388</td>
<td>0.567</td>
<td>0.193</td>
</tr>
<tr>
<td>I find organic foods in general to be overpriced</td>
<td>-0.184</td>
<td>0.066</td>
<td>0.771</td>
</tr>
<tr>
<td>Organic standards determine how foods are handled and processed after the farm gate</td>
<td>0.434</td>
<td>-0.131</td>
<td>0.449</td>
</tr>
<tr>
<td>Organically produced foods are not safer to consume than conventionally produced foods</td>
<td>0.486</td>
<td>0.447</td>
<td>-0.155</td>
</tr>
<tr>
<td>Buying organically produced food does not benefit local farmers</td>
<td>0.35</td>
<td>0.461</td>
<td>-0.305</td>
</tr>
<tr>
<td>Factor Mean Score</td>
<td>2.896</td>
<td>2.510</td>
<td>1.856</td>
</tr>
<tr>
<td>Eigenvalue post rotation</td>
<td>3.879</td>
<td>2.157</td>
<td>1.288</td>
</tr>
<tr>
<td>Variance</td>
<td>0.277</td>
<td>0.154</td>
<td>0.088</td>
</tr>
<tr>
<td>Cronbach α</td>
<td>0.838</td>
<td>0.369</td>
<td>0.100</td>
</tr>
<tr>
<td>KMO</td>
<td></td>
<td>0.869</td>
<td></td>
</tr>
</tbody>
</table>
common variance and warrant a factor analysis to follow up. In the factor analysis, principal-component was used as the factor extraction method. Under the principal component method, the observed variables are formed into linear combinations that accounts for the largest amount of variance in the sample hence the 'first principal factor’. Then the next linear combination of variables that accounts for the next largest amount of variance is termed 'second principal factor’, and so on. The unrotated results indicate that three principal factors had Eigenvalues greater than one. Factor one, two and three had unrotated Eigenvalues of 4.482, 1.617, and 1.175 respectively and the cumulative variance explained by these three factors accounts for 51.96 percent. Sometimes the factor patterns are not clear, but by rotating the dimensional space of the factor loadings, clarity regarding the factors is gained. After a varimax rotation, the results indicate three factors with Eigenvalues greater one. The first factor accounted for 27.71 percent of the survey variance, the second factor accounted for 15.41 percent variance, while the third factor accounted for 8.85 percent variance. The rotated factor loadings are examined and used to develop a sense of the latent structure.

Considering only those factor loadings that are greater than 0.5 in bold, factor one is associated with six items, factor two is associated with two items, and factor three had one item with factor loadings greater than 0.6. Although there are no standardized thresholds for evaluating the factor loadings, other studies have considered a factor loading greater than 0.4 to 0.5 to be significant (Constanigro et al., 2011; Cranfield et al., 2012). The three factors that represented the latent constructs were labelled based on the items with the largest factor loadings. The first factor was labelled as Environmental concerns and quality from buying organic, the second as Taste and
safety of organic food, and the third as Price. The mean multi-item score for each were 2.896, 2.510 and 1.856 respectively, suggesting that consumers in the sample were more likely to purchase organic food products that are characterized by environmental stewardship and quality driven compared to taste and safety, and price respectively. While the survey respondents all agree in broad terms with the three identified factors, environmental concerns and quality was given a higher emphasis in the purchasing decisions of organically produced foods. To evaluate the reliability of those items within each factor, Cronbach’s $\alpha$ was calculated. The only factor with a Cronbach’s $\alpha$ greater than the 0.7 threshold was factor one: environmental concerns and quality from buying organic, thus indicating a low level of reliability in the other two factors. The low Cronbach’s $\alpha$ for factor two and three could possibly be due to the low number of items in the factor explain the observed variance.

For the set of psychographic questions pertaining to the respondents opinion on locally produced foods, the results can be found in Table 5.5. The KMO test statistics is 0.8739, which indicates a high degree of common variance. Following the same factor analysis performed in the set of psychographic questions for organic foods, the unrotated results retained three factors with Eigenvalues greater than one. Unrotated factors one, two and three were able to explain 56.85 percent of the total variance, and their Eigenvalues were 4.268, 1.459, and 1.095, respectively. Post varimax rotation, the explained variance did not change, while the post rotation Eigenvalues were 2.994, 2.626 and 1.202, respectively. Considering those factor loadings greater than 0.5, factor one and two retained five items while factor three retained two items. Factors were labelled as following: Quality and safety of local foods; The need to support local producers and address environmental
concerns; and \textit{Price and convenience}. The multi-item mean score for the three local food factors were: 2.759, 2.228, and 3.062 respectively. This result suggests that consumers in the sample were more likely to purchase local food products that were characterized by price and convenience, quality and safety, followed by environmental stewardship respectively. In broad terms, the latent construct can be explained by the three identified factors, respondents gave price and convenience a higher emphasis than the other two factors in the purchasing decisions of locally produced foods. Quality; safety; the need to support local producers and to address environmental concerns were considered to be equivalent in terms of factors that influences purchasing decisions for locally produced foods. The only factor with a Cronbach $\alpha$ less than the threshold of 0.7 was the third factor (price and convenience), thus indicating a higher reliability in factor one and two.

The results from the food scale questions developed by Lusk (2011) provides a valid representation of the factors that respondents deemed as important when purchasing organic and locally produced foods. Although the results from the food scale cannot be compared directly with the exploratory factor analysis, however, inferences can be made between the two analysis. Price was identified by both analysis to be important, however the same respondents also indicated that price was the least likely factor to be considered when purchasing for organic food products. Freshness and taste from the food scales were identified to be the important factors and was also captured by the exploratory factor analysis. Conversely, environmental impact were considered by the food value scale as mediocre in terms of importance to be considered when purchasing organic and locally produced red tomato and gala apple by the respondents.
Table 5.5: Factor Loadings From Exploratory Factor Analysis of Opinions About Locally Produced Foods

<table>
<thead>
<tr>
<th>Item</th>
<th>Quality and Safety of Local Foods</th>
<th>Support Local Producers and Environmental Concerns</th>
<th>Price and Convenience</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a lower risk of exposure to pesticide contamination in locally produced foods</td>
<td>0.654</td>
<td>0.002</td>
<td>0.146</td>
</tr>
<tr>
<td>Eating locally produced food is better for my health</td>
<td>0.797</td>
<td>0.199</td>
<td>0.034</td>
</tr>
<tr>
<td>Locally produced food is of a higher quality than their conventionally grown counterparts</td>
<td>0.723</td>
<td>0.280</td>
<td>0.0319</td>
</tr>
<tr>
<td>Locally produced food is more nutritious than conventionally grown foods</td>
<td>0.810</td>
<td>0.139</td>
<td>0.036</td>
</tr>
<tr>
<td>Locally produced foods taste better than their conventional counterparts</td>
<td>0.671</td>
<td>0.310</td>
<td>-0.037</td>
</tr>
<tr>
<td>Buying locally sourced foods has large impact on the well being of my local community</td>
<td>0.239</td>
<td>0.657</td>
<td>-0.089</td>
</tr>
<tr>
<td>Buying food at local farmers market gives me better information about the food’s origin</td>
<td>0.339</td>
<td>0.622</td>
<td>-0.039</td>
</tr>
<tr>
<td>Buying locally produced foods reduces the environmental impact of the production process</td>
<td>0.227</td>
<td>0.752</td>
<td>0.051</td>
</tr>
<tr>
<td>Buying locally produced foods reduces my carbon footprint</td>
<td>0.096</td>
<td>0.788</td>
<td>0.031</td>
</tr>
<tr>
<td>Food at the farmers market that is labelled “local” is produced locally</td>
<td>0.244</td>
<td>0.540</td>
<td>-0.056</td>
</tr>
<tr>
<td>I can never find any local foods available at large national supermarket chains</td>
<td>0.066</td>
<td>0.185</td>
<td>0.758</td>
</tr>
<tr>
<td>Locally produced foods are usually over priced</td>
<td>0.000</td>
<td>-0.061</td>
<td>0.633</td>
</tr>
</tbody>
</table>

Factor Mean Score: 2.759 2.228 3.062
Eigenvalue post rotation: 2.994 2.626 1.202
Variance: 0.249 0.219 0.100
Cronbach’s α: 0.815 0.773 0.311

KMO: 0.8739
5.3.4 Estimation Results

In this section, the estimation results from the conditional logit model for both red tomato and gala apple choice experiment are presented and discussed. Recall that both choice experiments included a “no choice or opt-out” option, in which respondents had the choice of choosing neither alternatives. This means there are no observed attribute levels for when respondents chooses neither alternatives. Haaijer et al.,(2001) suggested that an alternative specific constant (ASC) be included in the model in order to model after this ”opt-out choice” option. Consequently a new variable coded ASC was added to the model, where it is specified as 1 for alternatives 1 and 2, and 0 for the ”opt-out” alternative. All the parameters were effect coded with the exception of price, distance and ASC. Price and distance were treated as continuous variables. According to Hensher et al. (2005), effects coding has the same advantages of dummy coding wherein the non linear effects in the attribute levels may be measured. Effect coding does not confound the base attribute level with overall mean of the utility function. That is, the utility associated with the base level of an attribute is not assumed to be by default the measurement of the average overall utility level \(^3\).

Table 5.6 reports the estimated coefficients, standard error and the level of significance for both red tomato and gala apple choice experiments. Both models were specified such that the probability of choosing a particular red tomato or gala apple is a function of the attribute levels for that food product and the ASC. The variables conventionally produced and purchased

\(^3\)In the case of dummy coding, the utility associated with the base level is given by:

\[ V_i = \beta_{0i} + \beta_{xi} \times 0 = \beta_{0i} \]

where \( \beta_{xi} \) is the parameter associated with attribute \( x \). The dummy coding that treats the base attribute as zero, and will always by default result in \( \beta_{0i} \), which is the average overall utility and not the utility associated with the last attribute level.
from a national-wide supermarket was chosen as the base alternatives and dropped from the regression in order to address the issue of collinearity. Consequently, the interpretations of the coefficients are all in relation to those two variables.

Table 5.6: Conditional Logit Estimations of Red Tomato and Gala Apple Choice Experiment Block

<table>
<thead>
<tr>
<th>Variables</th>
<th>Red Tomato CE</th>
<th></th>
<th>Gala Apple CE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient    SE</td>
<td>p ≤ z</td>
<td>Coefficient    SE</td>
<td>p ≤ z</td>
</tr>
<tr>
<td>Price</td>
<td>-1.4333 0.0536 0.0000</td>
<td></td>
<td>-1.6275 0.0586 0.0000</td>
<td></td>
</tr>
<tr>
<td>Distance between production location to the point of consumption at the home (per 10Km)</td>
<td>-0.0087 0.0007 0.0000</td>
<td></td>
<td>-0.0073 0.0007 0.0000</td>
<td></td>
</tr>
<tr>
<td>Non-certified organic</td>
<td>0.0807 0.0320 0.012</td>
<td></td>
<td>-0.0067 0.0320 0.853</td>
<td></td>
</tr>
<tr>
<td>Certified organic</td>
<td>0.1223 0.0312 0.0000</td>
<td></td>
<td>0.0588 0.0316 0.062</td>
<td></td>
</tr>
<tr>
<td>Purchased from the farmers market</td>
<td>0.0412 0.0382 0.280</td>
<td></td>
<td>0.0429 0.0379 0.258</td>
<td></td>
</tr>
<tr>
<td>Purchased from an independent grocery</td>
<td>-0.1087 0.0390 0.005</td>
<td></td>
<td>-0.0429 0.0386 0.525</td>
<td></td>
</tr>
<tr>
<td>Purchased from a provincial-wide supermarket</td>
<td>0.1698 0.0373 0.0000</td>
<td></td>
<td>0.0568 0.0375 0.129</td>
<td></td>
</tr>
<tr>
<td>Alternative specific constant</td>
<td>3.1096 0.1081 0.0000</td>
<td></td>
<td>3.2155 0.1079 0.0000</td>
<td></td>
</tr>
</tbody>
</table>

N: 9576 9600
Log-likelihood: -2633.430 -2794.883
Pseudo $R^2$: 0.2490 0.2050
LR Chi(8): 1746.68 1441.35

The overall goodness of the model fit (Pseudo $R^2$) for the red tomato CE was 0.2490, suggesting that 25 percent of the total variability can be explained with the current conditional logit model. For the red tomato CE, all of the coefficients were significant at the ten percent level or better, except
for purchasing from the farmers market. The coefficients on price, distance between the production locale to point of consumption at the home, and purchasing from an independent grocery were all negative. While the remaining coefficients (non-certified organic, certified organic, purchased from the farmers market, purchased from a provincial-wide super market, and ASC) were positive. The negative sign on an attribute implies a form of disutility associated with a product that contains that attribute, thus the likelihood of purchasing such product decreases. This means that, price and distance between production to consumption at the home constitutes, and purchased from an independent grocery have an inverse relationship with the likelihood of purchasing. The intuition would be that consumers were less likely to purchase red tomatoes when price increases or when the distance that the food product has to travel increases. Given the negative coefficients for the independent grocery retail venue, respondents were signalling that they were less likely to purchase red tomatoes from independent grocery store compared to the other types of retail venue. A possible hypothesis for such observation is that independent grocery stores were often associated with charging a higher premium for their products. Another plausible explanation could be that respondents were unfamiliar with the definition of an independent grocery stores and may associate independent grocers with ethnic and/or oriental stores that does not sell the mainstream supermarket products. In general, respondents were more likely to purchase organic red tomatoes than the conventional counterpart. However, the magnitude of the coefficient for certified is larger than non-certified organic, suggesting that respondents preferred certified organic red tomato from non-certified organic. Future study should look into the effects of brand trust, price, and other factors that consumers use to differentiate products in order to
understand the latent construct of purchasing organic and locally produced foods. The positive coefficient on the ASC attribute can be interpreted as a positive impact on the consumers utility when one chooses the purchase alternative.

The overall goodness of the model fit $R^2$ for the gala apple CE was 0.2050. The significant coefficients at the 10 percent level or better were price, distance between the production location to the point of consumption at the home, certified organic, and the ASC. All other coefficients (non certified organic, purchased from the farmers market, independent grocery store and provincial-wide supermarkets) were not significant. As expected, price and distance had a negative coefficient, implying that there is a disutility with an increase in price or distance. The disutility associated with independent grocery can be explained with the same story as in the red tomatoes. While the disutility from non-certified organic is less intuitive and unclear. The positive and significant coefficients of ASC, and certified organic suggest that respondents are more likely to purchase gala apples that are certified organic and tends to shy away from the "opt-out" alternative. Considering that the other retail venues were insignificant, the likelihood of respondents purchasing gala apples from the farmers market and/or the independent grocery is no different than the likelihood of purchasing at the national-wide supermarket. A feasible hypothesis is that the retail channel does not matter to consumers for when they purchase organic and/or locally produced gala apples.

Recall that red tomato and gala apple were both products chosen to represent on a broad perspective, the typical fresh non processed food products that the average Canadians would purchase and consume. Given that both products belonged to the same generic category of fresh produce, it
was unexpected that respondents have indicated difference in the treatment of attributes between red tomato and gala apple. Gala apples were more susceptible to changes in price, whereas red tomatoes prices were less sensitive to changes. The disutility of the distance travelled by the food product (between the point of production to consumption at the home) was larger for the red tomatoes than the gala apples. This is probably related to the perishable state of a tomato compared to apples, suggests that the perception of freshness and taste also depreciates much quicker for the red tomato. As freshness and taste was indicated by the psychographic questions, and from the food attribute scale, as one of the key latent constructs, it makes intuitive sense that when freshness or taste depreciates the utility also decreases. The choice in retail venues were found to be more significant when consumers are purchasing red tomatoes than gala apples. Consumers prefer provincial-wide supermarkets as the venue for purchasing red tomatoes than the national-wide supermarkets, however, the same is not true for gala apples. Although certified organic were significant in both CE, red tomatoes were more responsive to the labelling of certified than gala apples. This suggest that certification and validation of organic is more important for tomato as a food product than apples.

**Estimated Willingness to pay**

While estimated coefficients are useful to empirically assess key factors related to food choices, it is not conveniently interpretable for the real market place. Consequently, transforming the estimated coefficients into willingness to pay estimates allows for monetary evaluation of the variables related to food choices. Table 5.7 reports the estimated WTP and the 95 percent confidence interval for the red tomato CE. WTP and the confidence interval is
estimated using the Krinsky Robb parametric bootstrap method. 4

Table 5.7: Willingness-to-pay for Red Tomato Choice Experiment

<table>
<thead>
<tr>
<th>Item</th>
<th>Red Tomato CE WTP</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance between production location to point of consumption at the home (per 10Km)</td>
<td>-0.0061</td>
<td>-0.0071</td>
<td>-0.0051</td>
</tr>
<tr>
<td>Non-certified organic</td>
<td>0.0563</td>
<td>0.0135</td>
<td>0.0960</td>
</tr>
<tr>
<td>Certified organic</td>
<td>0.0853</td>
<td>0.0421</td>
<td>0.1257</td>
</tr>
<tr>
<td>Purchased from the farmers market</td>
<td>0.0288</td>
<td>-0.0212</td>
<td>0.0775</td>
</tr>
<tr>
<td>Purchased from an independent grocer</td>
<td>-0.0758</td>
<td>-0.1279</td>
<td>-0.0227</td>
</tr>
<tr>
<td>Purchased from a provincial-wide supermarket</td>
<td>0.1184</td>
<td>0.0700</td>
<td>0.1687</td>
</tr>
</tbody>
</table>

Distance had a negative WTP which suggests that the larger the distance away between the two locales, the less respondents were willing to pay. Respondents were also willing to pay a premium for non-certified organic, certified organic, purchased from the farmers market, and purchased from a provincial-wide supermarket. The magnitude of WTP between certified and non-certified organic is minute, suggesting that respondents view both production attributes to be similar. Although respondents were willing to pay a premium for purchasing at the farmers market, the magnitude of the premium is small compared to the provincial-wide supermarket. A plausibility is that provincial wide supermarkets were more convenient to shop at compared to the farmers market. Respondents may find farmers market restrictive in the location, travelling, and availability on certain days.

The same Krinsky Robb bootstrap method was used to estimate the WTP and confidence interval for the gala apple CE, and the results are presented in Table 5.8. The WTP for the distance travelled by the food product from the location of production to the consumption at the home and non-certified organic is negative. Other attributes (certified organic, 4According to which Hole (2007) this method derives its estimations of confidence interval by taking draws from a multivariate normal distribution with the means and covariance given by the estimated coefficients and covariance matrix from the earlier conditional logit regression.
Table 5.8: Willingness-to-pay for Gala Apple Choice Experiment

<table>
<thead>
<tr>
<th>Item</th>
<th>Gala Apple CE WTP</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance between production location to point of consumption at the home (per 10Km)</td>
<td>-0.0044</td>
<td>-0.0053</td>
<td>-0.0036</td>
</tr>
<tr>
<td>Non-certified organic</td>
<td>-0.0041</td>
<td>-0.0413</td>
<td>0.0302</td>
</tr>
<tr>
<td>Certified organic</td>
<td>0.0361</td>
<td>-0.0031</td>
<td>0.0725</td>
</tr>
<tr>
<td>Purchased from the farmers market</td>
<td>0.0264</td>
<td>-0.0162</td>
<td>0.0706</td>
</tr>
<tr>
<td>Purchased from an independent grocer</td>
<td>0.0151</td>
<td>-0.0601</td>
<td>0.0309</td>
</tr>
<tr>
<td>Purchased from a provincial-wide supermarket</td>
<td>0.0349</td>
<td>-0.0088</td>
<td>0.0791</td>
</tr>
</tbody>
</table>

purchased from the farmers market, purchased from an independent grocer, and purchased from a provincial wide super market) yielded a positive measure of WTP. The same argument can be made for the negative WTP in the distances as with the red tomato CE. The further the gala apple has to travel, the lower the premium consumers were willing to pay. Respondents were willing to pay for organic, however, it must be certified otherwise respondents were not willing to pay a premium for non-certified organic gala apples. This could suggest that consumers consider trust to be a valuable attribute, and is willing to pay more for apples that are certified. Although respondents were willing to pay a premium for all three retail venues, the magnitude of premium orders from the highest to lowest in the following fashion: provincial wide supermarket, farmers market, and independent grocer. This result suggests that producers selling locally grown food maybe able to capture different degrees of premium depending on the retail venue.

5.4 Summary

From a broad perspective the estimated parameters of factors that influence food choices closely resembles that of the Canadian census. As the results show, price, distance between production location to point of consumption at the home, certified organic; non certified organic, and the types of retail
channels have an influence on the likelihood of purchasing food products labelled as organic and local. Moreover, factors such as price, taste, freshness, safety, and environmental concerns were associated with organically and locally produced foods. This suggest that there are common factors consumers often associate with local and organically produced foods. However, the estimated WTP indicates that consumers were willing to pay more for the ‘localness’ of fresh produce, while the same consumers were not willing to pay fresh produced to be non certified organic. When consumers evaluate purchasing decisions at the product level, the same food values used to evaluate organic versus local seems to differ completely as indicated by the inverse signs between WTP and estimated coefficients.
Chapter 6

Conclusion

6.1 Introduction

As the food production chain becomes progressively more complex, consumers have become further distanced from the food they eat, agriculture producers and land. In this context, segments of consumers’ are increasingly concerned and critical about food production methods. According to Grunert (2005), consumers are demanding food to be differentiated through quality in a more complex manner. By acknowledging that consumers in developed countries are interested in knowing more about the food they eat, the food industry should embrace the provision of information to differentiate products and segment demand. However, there is a lack of market intelligence to shift from the promotion of food products to the promotion of food attributes (Costanigro et al., 2013). Consequently, three major research question about local and organic food arises: First, how local is local food? Second, what food attributes do Canadians associate with local food, organic food, and locally produced organic food? Third, what are the premiums that Canadian consumers are willing to pay for the identified
attributes?

To find answers to these questions, this research proceeded in the following manner. First, an in-depth literature review was conducted to identify factors that influenced the purchasing decision on organic and locally produced foods, understand how the attributes of organic and local interact and establish any relationship between organic, local and food miles. This is followed by the design of the survey and choice experiment. There were two choice experiment, one for red tomatoes and one for gala apples. The basket of attributes that characterized the alternatives in the choice experiments was based on the strands of literature on consumers choices on local and organic food. The choice experiment was designed by optimizing the D-efficiency, and the full factorial design was blocked into 12 blocks. The choice experiment was embedded in an internet survey, which was disseminated by Ipsos Marketing (Agriculture and Animal Health). After the data was collected, an exploratory factor analysis was used to identify any underlying latent construct in the series of psychographic questions. Followed by the conditional logit regression and estimated willingness-to-pay was performed to identify and estimate the premiums that Canadian consumer’s were willing to pay for the attributes associated with local and/or organically produced foods.

6.2 Summary of Results

Broadly speaking, the socio-demographic characteristics of the red tomato choice and gala apple choice experiments resembles that of the Canadian population. However, males were under sampled by roughly 60 to 70 percent. Price, taste and freshness were prioritized by the respondents to be the most important factors in their purchasing decision for both organic and locally
Inferences were made between the exploratory factors and the food scale results developed by Lusk (2011). In both analysis, price was identified to be the main factor influencing food choices. Freshness and taste from the food scales were identified to be the important factors and was also captured by the exploratory factor analysis. Conversely, environmental impact were considered by the food value scale as mediocre in terms of importance to be considered when purchasing organic and locally produced red tomato and gala apple by the respondents. This contradicts the results from the exploratory factor analysis, where respondents were more likely to purchase organically produced foods when such food is characterized by environmental stewardship and higher quality. Broadly speaking, the same important factors and latent constructs were captured, confirmed and validated by both the food scale values and the exploratory factor analysis.

Based on conditional logit estimation, all the attributes (price, production systems, retail channels, and food mileage) in the red tomato CE were significant at the ten percent level or better, except for purchasing from the farmers market. Conversely the only significant coefficients for the gala apple choice experiment were: price, distance, certified organic, and the alternative specific constant. Price and food mileage were represented by a negative coefficient, suggesting that an increase in price and/or food mileage generates dis-utility for the consumer. Respondents were preferred certified organic from non-certified organic for the red tomatoes; while respondents indicate that non-certified organic was not preferred at all for gala apples. The dis-utility associated with food mileage of red tomatoes were more larger than gala apples. This is probably related to the perishable state of tomatoes versus apples. Retail channels had mixed results on the likelihood of
purchase; independent grocers had a negative coefficients for the red tomato choice experiment, while all the retail channel coefficients were not significant for the gala apple choice experiment.

By converting the estimated coefficients into willingness to pay estimations, the result allows for monetary valuation of the attributes. For the red tomato choice experiment, distant between production location to the point of consumption at the home, and independent grocer retail channels both had negative premiums of -$0.00061 per 10 kilometres and -$0.0758 respectively. The premiums for non-certified organic, certified organic, farmers market, and provincial-wide supermarket were estimated to be: $0.0563, $0.0853, $0.0288, and $0.1184 respectively.

As for the gala apple choice experiment, distance and non-certified organic had negative premiums of -$0.0044 per ten kilometres per Kg and -$0.0041 respectively. While the rest of the estimated premiums for attributes: certified organic, farmers market, independent grocer and provincial wide supermarket retail channels were as follows $0.0361, $0.0264, $0.0151, and $0.0349 respectively. These findings indicate that the type of retail channel and production system were significant in the purchasing decision, however it also depends on the food product itself. Price and distance were significant in the purchasing decision regardless of the food product. At the product level, price, taste and safety were the three most factors considered by the respondent during their decision making process for both organic and locally produced foods. This suggests that organic and local food producers should market their products when an emphasis on price, taste and safety as the primary targeted attributes or selling point.
6.3 Market and Policy Implications

Findings of this research can provide useful information to agribusinesses, entrepreneurs and policy advisers. Particularly, these results have important implications for agribusinesses looking for marketing information regarding the size and opportunity in the organic and local food market. The empirical results suggest that consumers often evaluate organic and local food with the attributes of price, taste, and freshness. To capture market premiums, producers should evaluate their opportunity cost against the estimated willingness to pay for the food mileage that Canadians are willing to pay. For every kilometres closer the production is to consumption at the home, WTP is higher. For producers, an increase in the ”localness” of their food product could possibly impose a higher cost from converting their operations into a local food system.

Policy makers in Ontario may find the results useful in evaluating whether Ontario really needs a local food act. Currently, Ontario’s legislature is considering a Local Food Act - Bill 36. The purpose of Bill 36 is to foster successful local food economies, to increase the awareness of local food and diversity, and to encourage new markets for food. The act intends to achieve their stated goal by broadening the definition of local food to include anything produced or harvested in the province, along with established goals for public sector organizations to achieve with respect to local food use. The current definition of local is defined by the Canadian Food Inspection Agency as: an item must originate no more than 50 kilometres from the place it’s sold to qualify as locally grown. By restricting the definition, there are two implications to be considered. First, producer’s access to retail channels is limited to the venues that are within the 50 kilometres radius. This may exclude a subset of producers that does not have access to a retail channel.
within the prescribed definition. For example, producers in Niagara region cannot sell their product as local in the GTA region. Second, this prescription will limit the size of the market for local food, where producers are unable to fully capture the extent of the market premiums.

From the perspective of Ontario’s policy maker, there are both benefits and costs to producers if the definition of local is broadened. The merits of the new definition would reduce the administrative cost of local food verification. However, if the public sector were to enforced the mandatory achievement proposed in Bill 36, then achieving these goals could possibly come at the expense of the taxpayer’s money. If the price on local food was low enough, then public sector organizations would already have transitioned over, hence the act may seem redundant.

Rather than forcing consumers to purchase local food and producers to transition to producing local food, the results of this study provides producers with the necessary market information to evaluate whether it is worth while to produce local food. If local food is defined along the dimension of distance, then producers could use the estimated willingness to pay for food mileage to evaluate the opportunity cost of switching to local food system. Consumers were found to have conflicting ideas and perspectives on how organic food or local food is defined. Rather than enforcing certain local food goals, the ministry should consider how to regulate locally produced foods, how to enforce the conditions that producers must meet to qualify their product as local, and to inform or educate consumers about local food regulations.
6.4 Limitation of Analysis

The only way to elicit non market valuation is to use choice experiments, however there are practical limitations of choice experiments that will be discussed in the following manner. The first concern is the experimental design. The choice experiment in this study investigated four factors of purchasing decision - production system, retail channel, total distance travelled by the food item, and price. However, it was clear that the four latent constructs were unable to fully capture and explain all the data variability, hence for the gala apple choice experiment the only significant coefficients were price, distance and ASC. Alternatively, the insignificant result regarding the production system and retail channel could suggest that purchasing venues and certification of organic and/or local does not matter to the consumer. The experimental design broadly assumed that food products are defined as either non processed fresh produce, or processed food products and the results between the two chosen fresh produce had conflicting results. Future study should investigate if the factors related to purchasing organic and/or local is rooted more deeply at the product level and not on a macro treatment of fresh non processed food products. Another limitations pertains to the chosen prices, because the survey was distributed on the internet across Canada the enlisted prices was based on the average food prices found in the city of Guelph and may not be fully representative across other provinces.

The next limitation relates to the survey design. In order to limit respondent burden, this study opted to block the choice design and by doing so there is a trade off for a decrease in design efficiency. Thus estimates from a less efficient design will also produce less accurate and less reliable results. In order to achieve 100 percent efficiency, the most ideal choice design is to subject all respondents with the full factorial design of 192 possible combina-
tions. This will cause a huge response burdened and may induce respondents to arbitrarily or randomly choose the alternatives without considering the attributes.

Distance was defined by the unit measurement of kilometres between the point of production to the point of consumption at the home. However, there are other unit of measurements for distance attribute in order to capture the degree of “localness”. For example size of the carbon footprint, by county or town of production, radius away from the home, and by driving time it took the produce to travel from production to retail venue. Different prescription of distance may evoke different perspectives on how consumer define local food. Since the definition of local is not homogeneous across consumers, it is important to address and compare other definitions to generate a more reliable estimate of “localness” and the premium for “localness”.

The last limitation is the selection of the choice model. The conditional logit model inherently assumes that preferences are homogeneous. Furthermore this study did not examine nor tested for heterogeneity and the observed contradicting results between the two choice experiment may hold some explanation through interacting with the socio-demographic variables.

6.5 Suggestions for Future Research

A number of limitations were present during this research, where future research could have built around. First, the choice design in this research revolves around identifying other factors that influences purchasing decision on organics and/or local food, and the willingness to pay for food purchased for in-home consumption. However, the other dimension of organic and local is the consumption outside of the home, future research should investigate whether consumers were more likely to purchase organic and/or local
food while dining out and to what extent are the size of the premium. It should be noted that criterion by which consumers define local and organic food products maybe be different when it is consumed outside the home. A comparison of the respective premiums will give agribusiness more market information as to which market is worth developing. For example, if consumers were willing to pay a higher premium for local food at a restaurant than for the same local food item for cooking at home then producers should target the retail channels that sells directly to restaurants and not at the provincial or national supermarkets.

Future research should also evaluate more carefully the elicitation of attributes in the choice experiment. The chosen attributes should ideally capture the latent construct of the purchasing decision of consumers, however it seems these sets of attributes were unique and dependent on the type of food item itself and not on the broad categorical of fresh versus non fresh or non processed versus processed foods. Due to the hypothetical nature of choice experiments, there are no immediate consequence for the choices made by the respondents thus the respondents maybe more inclined to provide results that may perceive as the ‘more socially responsible’ choice. Future research should consider other ways of elicitation choices through real auction experiment or experiments with real consequences in order to elicit more realistic responses.

Lastly, the analysis of the choice model is another challenge for future research. The simplicity of the conditional logit allows for easier computations and the assumption of homogeneous individuals with the IIA property is not realistic. Future research should consider other choice modelling techniques such as the mixed logit to account for heterogeneous preferences like the Hausman test for IIA property.
Bibliography


[70] Roberta Sonnino. The power of place: embeddedness and local food systems in Italy and the UK. *Anthropology of Food*, (S2), 2007.


Ontario Agricultural College  
Department of Food, Agricultural and Resource Economics  

Consumer perceptions of locally grown organic foods  

Researchers in the Department of Food, Agricultural, and Resource Economics at the University of Guelph are exploring consumer perceptions of and attitudes toward various food issues. The intent of this research is to better understand the factors that motivate consumer purchases of locally grown organic foods. This on-line survey is expected to take no longer than 20 minutes to complete.

You are free to participate or not in this survey and should you choose not to participate, you can withdraw from the survey at any time. As well, you are free to skip any question you would prefer not to answer. By completing and submitting this survey, you provide consent to participate in the study. Individual responses will be anonymously collected and no identifying information about you will be collected (including IP addresses). All data will be stored on a secure computer, and will only be used for academic research purposes. Further information on your consent to participate can be reviewed by clicking here.

This study has been reviewed and received ethical clearance through the University of Guelph Research Ethics Board. If you have any questions contact the project leader, Dr. John Cranfield, at 519-824-4120 extension 53708, or via email at jcranfie@uoguelph.ca. Should you wish to receive a copy of the results from this study, please email the project leader directly at the above email address.

*By clicking this box I acknowledge that I have read and understand the above informed consent document and that I agree to be a participant in the survey “Consumer perceptions of locally grown organic foods”.*

---

S1) Our survey includes people of all ages; can you please select your age category?  
(Please check one)  
- Under 18 years  
- 18-24 years  
- 25-34 years  
- 35-49 years  
- 50-60 years  
- 61-65 years  
- 65 years or older  

[If less than 18 years - thank and terminate]
S2) To understand how responses to our survey vary across Canada, can you please select the province/region in which you reside (Please check one):

- Alberta
- British Columbia
- Manitoba
- New Brunswick
- Newfoundland and Labrador
- Nova Scotia
- Nunavut
- Ontario
- Prince Edward Island
- Québec
- Saskatchewan
- Yukon

[If Nunavut or Yukon – thank and terminate]

S3) Today, we are looking for people who work in certain sectors. Are you, or is any member of your immediate family or close friends employed in any of the following sectors? (Please check one)

- TV/Radio/Press/Newspaper/Magazine
- Travel Agency
- Ad agency/Public relations
- Banking
- Agricultural production (i.e. farming)
- Food industry (e.g. processing, distribution, wholesaling, retailing)
- Market Research/Marketing
- Insurance
- None of the above

[If agricultural production and or food industry – thank and terminate]

S4) Which of the following describes you best? (Please check one)

- I am the primary grocery shopper for my household
- I share the grocery shopping responsibility for my household
- Someone else has the responsibility of grocery shopping for my household

[If someone else has the responsibility of grocery shopping for my household – thank and terminate]

S5) In a given month (assume that there are four weeks in a month), how many times do you shop for groceries? (Please check one)

- Once a month
- Twice a month
- Three times a month
- Four or more times a month
1) Please indicate which of the following store types you have visited to purchase conventionally produced foods (defined here as food that is not labeled as organic or organically produced, or locally produced), food that is labeled as organic (or organically produced) and food that is labeled as locally produced, for consumption in the home? (Check all that apply)

<table>
<thead>
<tr>
<th>Store type</th>
<th>Conventional foods</th>
<th>Foods labeled as organic</th>
<th>Foods labeled as locally produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large chain grocery stores (for example Loblaw’s, Zehrs, Dominion, A&amp;P, Sobeys, Safeway, Metro, Maxi, etc.)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Discount grocery stores (for example FoodBasics, No Frills, Price Chopper, etc.)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Independent grocery stores (for example Longo’s Farm Boy, Highland Farms, Bruno’s, Vince’s, L&amp;M, Michael-Angelo’s, Dennigers, etc.)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Ethnic grocery stores</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Health food stores</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Mass merchandisers or discount department stores (for example Zellers, Walmart, etc.)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Warehouse club stores (for example Costco, Sam’s Club)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Butcher shop</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Farmers market or directly from a farm or farmer</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>I don’t purchase</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Other (Please specify): __________</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

[Coding instructions: randomize order for all but the last two]

**Next, we would like to ask you a few questions related organic foods**

2) Overall, how informed would you say you are about the organic food production standards in Canada? *(Please check one)*

- [ ] Know a lot about the organic food production standards in Canada
- [ ] Know some aspects of the organic food production standards in Canada
- [ ] Know a little about the organic food production standards in Canada
- [ ] Know very little about the organic food production standards in Canada
- [ ] Know nothing about the organic food production standards in Canada
3) Please indicate your level of agreement with the following statements: *(Check one per line)*

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree or disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organically produced foods are not safer to consume than conventionally produced foods</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Organic food is more nutritious than conventional food</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Eating organic food will improve my overall health</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Organic foods are produced with the use of pesticides</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Organic standards determines how foods are handled and processed after the farm gate</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>There is a lower risk of exposure to pesticide contamination in organic foods</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>I find organic foods in general to be overpriced</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

[Coding instructions: randomize order]

4) How informed would you say you are about the organic farming practices used in Canada? *(Please check one)*

- Know a lot about the organic farm practices in Canada
- Know some aspect about the organic farm practices in Canada
- Know a little about the organic farm practices in Canada
- Know very little about the organic farm practices in Canada
- Know nothing about the organic farm practices in Canada
5) Please indicate your level of agreement with the following statements: *(Check one per line)*

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree or disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The environmental impact of buying organically produced foods is higher than conventionally produced foods</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Buying organically produced foods helps to reduce my carbon footprint</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Buying organically produced foods helps to support my local community</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Buying organically produced food does not benefit local farmers</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>I eat organically produced foods because it supports environmentally sound farm practices</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Organically produced foods taste worse than conventionally produced foods</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Organically produced foods are fresher than conventionally produced foods</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>

[Coding instructions: randomize order]
6) The following question asks you to divide 100 points between a set of items you might consider if you were to purchase organically produced foods. Distribute the 100 points across these items, giving the more important item a greater number of points. The computer will prompt you if your total does not equal exactly 100 points. (You may also allocate zeros to items that you are not concerned with).

<table>
<thead>
<tr>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Freshness</td>
</tr>
<tr>
<td>Taste</td>
</tr>
<tr>
<td>Price</td>
</tr>
<tr>
<td>Safety</td>
</tr>
<tr>
<td>Convenience</td>
</tr>
<tr>
<td>Nutritional content</td>
</tr>
<tr>
<td>Tradition (preserving traditional consumption patterns)</td>
</tr>
<tr>
<td>Origin (were the agricultural good were grown)</td>
</tr>
<tr>
<td>Fairness to organic food producers</td>
</tr>
<tr>
<td>Appearance</td>
</tr>
<tr>
<td>Environmental impact</td>
</tr>
<tr>
<td>Naturalness</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

[Coding instructions: randomize order]  

**Next, we would like to ask you a few questions related to local food**

7) Please indicate your level of agreement with the following statements: (check one per line)

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree or disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a lower risk of exposure to pesticide contamination in locally produced foods</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Eating locally produced food is better for my health</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Locally produced food is of a higher quality than their conventionally</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Statement</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>I can never find any local foods available at large national supermarket chains</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Buying locally sourced foods has a large impact on the well being of my local community</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Locally produced food is more nutritious than conventionally grown foods</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Food at the farmers market that is labeled &quot;local&quot; is produced locally</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Buying locally produced foods reduces my carbon footprint</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Locally produced foods are usually over priced</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Locally produced foods taste better than their conventional counterparts</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Buying food at local farmers markets gives me better information about the food's origins</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Buying locally produced foods reduces the environmental impact of the production process</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

[Coding instructions: randomize order]
8) The following question asks you to divide 100 points between a set of items you might consider if you were to purchase locally produced foods. Distribute the 100 points across these items, giving the more important item a greater number of points. The computer will prompt you if your total does not equal exactly 100 points. (You may also allocate zeros to items that you are not concerned with).

<table>
<thead>
<tr>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshness</td>
</tr>
<tr>
<td>Taste</td>
</tr>
<tr>
<td>Price</td>
</tr>
<tr>
<td>Safety</td>
</tr>
<tr>
<td>Convenience</td>
</tr>
<tr>
<td>Nutritional content</td>
</tr>
<tr>
<td>Tradition (preserving traditional consumption patterns)</td>
</tr>
<tr>
<td>Origin (were the agricultural good were grown)</td>
</tr>
<tr>
<td>Fairness to local food producers</td>
</tr>
<tr>
<td>Appearance</td>
</tr>
<tr>
<td>Environmental impact</td>
</tr>
<tr>
<td>Naturalness</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

[Coding instructions: randomize order]

We would now like to ask you some hypothetical questions regarding what you might be willing to pay for Gala apples that are produced in different ways and sold in different retail venues. For each question, imagine that you are shopping for Gala apples and are faced with choosing apples with the characteristics described below. Whether or not you currently eat Gala apples, we would appreciate you completing the following choice comparisons.

Even though the payment of money in this part of the survey is hypothetical, we ask that you respond to the questions as if it were an actual decision involving real cash payment. As you answer this question please keep in mind what you would normally pay for apples, how much you spend for food in general, and your interest in the products described.

In order to answer these questions accurately please read the following definitions carefully:

**Production system**: indicates the nature of the allowed agricultural practices used during production. The options you might see include: conventional production, growing organically, and certified organic.

**Retail venue**: indicates the retail outlet where you would be able to buy the product. The options are farm direct (e.g. farmers’ markets, farm sales, or roadside stands),
regional grocery stores, province-wide grocery chains and national grocery chains. Even if you do not normally shop at the retail venue listed in the product description, please complete the choice comparison.

**Distance**: indicates the distance travelled by the product in going from the farm where it is produced, to the retail venue where it is for sale, and from that point to your home.

9) During a shopping trip when you purchase Gala apples, if the following options were the only ones available, which would you purchase? *(Check one)*

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Alternative</th>
<th>Product 1</th>
<th>Product 2</th>
<th>I would not choose either product 1 or product 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production system</td>
<td></td>
<td>Certified organic</td>
<td>Conventionally produced</td>
<td></td>
</tr>
<tr>
<td>Price ($/kg)</td>
<td></td>
<td>$1.50</td>
<td>$0.75</td>
<td></td>
</tr>
<tr>
<td>Retail venue</td>
<td></td>
<td>Farm direct</td>
<td>National supermarket chain</td>
<td></td>
</tr>
<tr>
<td>Distance</td>
<td></td>
<td>10 km</td>
<td>100 km</td>
<td></td>
</tr>
<tr>
<td>I would choose:</td>
<td></td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
</tbody>
</table>

(Please check one box)

10) During a shopping trip when you purchase Gala apples, if the following options were the only ones available, which would you purchase? *(Check one)*

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Alternative</th>
<th>Product 1</th>
<th>Product 2</th>
<th>I would not choose either product 1 or product 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production system</td>
<td></td>
<td>Grown organically</td>
<td>Conventional produced</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td></td>
<td>$2.26</td>
<td>$1.50</td>
<td></td>
</tr>
<tr>
<td>Retail venue</td>
<td></td>
<td>Province-wide supermarket chain</td>
<td>National supermarket chain</td>
<td></td>
</tr>
<tr>
<td>Distance</td>
<td></td>
<td>50 km</td>
<td>100 km</td>
<td></td>
</tr>
<tr>
<td>I would choose:</td>
<td></td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
</tbody>
</table>

(Please check one box)

11) During a shopping trip when you purchase Gala apples, if the following options were the only ones available, which would you purchase? *(Check one)*

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Alternative</th>
<th>Product 1</th>
<th>Product 2</th>
<th>I would not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production system</td>
<td></td>
<td>Certified organic</td>
<td>Grown organically</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td></td>
<td>$3.77</td>
<td>$0.75</td>
<td>I would not</td>
</tr>
</tbody>
</table>
12) During a shopping trip when you purchase Gala apples, if the following options were the only ones available, which would you purchase? (Check one)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Product 1</th>
<th>Product 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production system</td>
<td>Certified organic</td>
<td>Conventionally produced</td>
</tr>
<tr>
<td>Price</td>
<td>$1.50</td>
<td>$1.30</td>
</tr>
<tr>
<td>Retail venue</td>
<td>Regional grocery chain</td>
<td>National supermarket chain</td>
</tr>
<tr>
<td>Distance</td>
<td>10 km</td>
<td>50 km</td>
</tr>
<tr>
<td>I would choose:</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

Finally, we would like to ask you a little about yourself. This information is only to help us interpret the results across the people who complete this survey and will be kept strictly confidential.

13) Please indicate your gender (Please check one)
- Male
- Female
- Other

14) What was your highest level of education you have completed? (Please check one)
- Some grade school
- Some high school
- High school graduate
- Some university/college
- University/college graduate
- Some graduate school
- Masters degree
- Doctoral degree

15) Which of the following best describes your marital status? (Please check one)
- Single
- Married/common law partner
- Separated/divorced
11 Widow/widower

16) How many people is currently living in your household (including yourself)?
(Please check one)
- 1
- 2
- 3
- 4
- 5
- 6 or more

17) Are there any children under 18 years of age in your household? (Please check one)
- Yes [skip to Q18]
- No [skip to Q19]

18) If there are children in your household, how many of those children fall into each of the following age group?
- 0-4 years of age ______
- 5-11 years of age ______
- 12-17 years of age ______

19) To understand the result from this survey, we need some indication of your total annual household income. We can understand that people are not comfortable providing this information but you can be assured that all information is confidential and is never associated with you as a named individual. Would you please indicate what your total annual household income was in 2011? (Please check one)
- Under $19,999
- $20,000-$24,999
- $25,000-$34,999
- $35,000-$44,999
- $45,000-$54,999
- $55,000-$64,999
- $65,000-$74,999
- $75,000-$84,999
- $85,000-$100,000
- More than $100,000

20) If you have any additional comments please feel free to express them below. (Please write in the space provided)

_________________________________________________________________________________________________

_________________________________________________________________________________________________

_________________________________________________________________________________________________

11
Thank you very much for your time. Your participation in this survey is very important and much appreciated.