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The Impact of the Organic Mainstream Movement: A Case Study of New England Organic Produce Prices

Megan M. Dolan
University of Massachusetts - Amherst, megan12122001@yahoo.com

THE IMPACT OF THE ORGANIC MAINSTREAM MOVEMENT: A CASE STUDY OF NEW ENGLAND ORGANIC PRODUCE PRICES

A Thesis Presented

by

MEGAN M. DOLAN

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Approved as to style and content by:

Julie A. Caswell, Chair

Nathalie Lavoie, Member

Daniel Lass, Member

Julie A. Caswell, Department Head
Department of Resource Economics

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CHAPTER 1

INTRODUCTION AND MOTIVATION

Organics have progressively become a more popular topic of discussion among growers, handlers, retailers, consumers and researchers since the early 1970s as consumers become more conscientious about their environment, health and what they are really eating. Consumer demand for organic foods has grown at an annual rate of approximately 20 percent through the 1990s compared to only 2 to 3 percent annual growth of conventional foods; organic food is one of the fastest growing segments of agricultural production (Thompson and Glaser 2001).

The availability of organics has drastically changed in the wake of increasing consumer demand. Once only available in small natural food stores or farmer's markets, organics are now sold to consumers through three main venues: natural food stores, conventional grocery stores, and direct consumer markets also referred to as farmer's markets. Table 1 on the following page presents definitions of the major retail formats in which organics are sold.

Suppliers are offering new organic varieties and food retailers are increasing their organic product assortment. The growth in organics is not just in groceries and produce. The assortment of organic products has expanded beyond fresh produce to include dairy, meats, and a vast variety of processed and convenience foods (Thompson 1998). Organic baby food, pet foods and a variety of personal care items are also being offered in the aisles of mainstream supermarkets (Thompson 1998).

Table 1. Major Retail Formats Selling Organic Food Products

Retail Format	**Definition**
Traditional Grocers	
Conventional Supermarket	Offers a full line of groceries, meat, and produce with at least $2 million in annual sales. These stores typically carry approximately 15,000 items and usually offer a deli service.
Superstore	A larger version of a traditional supermarket with at least 40,000 square feet in total selling area and 25,000 items. Offer an extended non-food array of items including health and beauty products and general merchandise.
Natural/Specialty Supermarket	Similar to a traditional supermarket dedicated to offering organic, specialty and natural products, e.g. Whole Foods.
Farmer's Market	A public market at which farmers and often other vendors sell produce directly to consumers.
Non-Traditional Grocers	
Supercenters	A large food/drug combination store and mass merchandiser under a single roof. They offer a wide variety of food, as well as non food merchandise, average more than 170,000 square feet and typically devote as much as 40 percent to grocery items.
Warehouse	A low-margin grocery store offering reduced variety, lower service levels, and a streamlined merchandising presentation, along with lower average prices.
Wholesale Clubs	A membership retail/wholesale hybrid with a limited variety of products presented in a warehouse type environment. These 120,000 sq. foot stores have 30 to 40 percent to grocery sales and sell mostly large sizes and bulk sales.

Adapted from the USDA/ERS 2005

Fresh organic fruits and vegetables are vital to the organic food sector as they are referred to as a "gateway" product group, meaning they are the first organic products purchased by consumers (Olberholtzer, Dimitri and Greene, 2005). In response to growing consumer demand, many conventional supermarkets and mass merchandisers have added organic produce items to their shelves. The newest source of competition in the organic produce market is nontraditional food retailing supercenters. The supercenter has become a one stop shopping venue for many financially conscientious consumers by combining food retailing with general merchandising. There are currently 1600 supercenters throughout the U.S., with Wal-Mart as the leading supercenter retailer opening its first supercenter in 1988.

As organic food products continue to move into the mainstream food retail market, it is becoming more and more important to examine the impact of traditional grocers and non-traditional grocers, such as Wal-Mart, entering specific food market segments. Are grocers allowing consumers to further stretch their organic grocery dollar or are food retailers increasing their market power to raise food prices overall? For the organic food market, is the influx of these grocers affecting the integrity of organic products?

The major focus of organic market research has been in the arena of supply, consumer demand and consumer benefit analysis. Little quantitative analysis has been done on the impact of market expansion and market structure beyond the consumer point of view. A 1996 study conducted by Park and Lohr examined supply and demand factors relevant to expected market expansion. However, given the length of time that has elapsed, new issues and impacts relevant to the changing market structure of the organics market have developed.

The USDA's Economic Research Service (ERS) has conducted rigorous research on the produce market and more specifically on the organic produce market. Dimitri and Greene (2003) examined recent growth patterns in the US organic foods market through analyses of farm-gate and wholesale prices. These authors contributed to a further study in 2005 analyzing price premiums in the US organic produce market (Olberholtzer, Dimitri and Greene, 2005). Even though the emphasis of these studies remained heavily on supply side factors influencing the organic market expansion, they concluded there was steady growth of organic produce that would likely continue into the future. The authors suggested the continued growth into the mainstream market would result in diminishing price differentials between organic and conventional food products if consumer demand continues to grow. Moreover, these authors highlighted the importance of further research as the organic market continues to grow, specifically at the retail price level.

In this regard it is relevant to explore the impacts of organics moving to the mainstream retail market on pricing strategies. This thesis examines the regional organic retail market of traditional and non-traditional grocers, including Super Stop and Shop, Whole Foods, Wild Oats, Trader Joe's and Wal-Mart Supercenters in the four New England States of Connecticut, Massachusetts, New Hampshire and Rhode Island. A regional analysis is important to examine the impact of traditional and non-traditional grocers on pricing strategies in relation to changing market structures. Aggregation of prices and quantities on a national level could result in aggregation bias as grocery chains, suppliers and consumer demographics vary greatly. The New England region is chosen for its diversified population as well as its abundance of traditional and nontraditional grocers.

For the empirical work of this thesis, the prices of the aforementioned stores are recorded and analyzed through an econometric model. The general objective is to determine retail pricing strategies for organic produce across different store formats in New England. This thesis also aims to provide some insight into the specific effect of Wal-Mart Supercenters on the retail price of organic produce in New England. Literature suggests the presence of Wal-Mart Supercenters results in lower grocery prices overall.

The data gathered from the food retailers in this thesis include retail price and merchandising information for thirteen organic produce items, including the top 11 in terms of organic sales. The data were collected from a sample of seventeen New England micro-markets of varying market structures. These micro-markets were formed from the metropolitan statistical areas as defined by the US Census. The varying market structures include markets with all store types present, with non-traditional supercenters (Wal-Mart) and traditional superstores (Super Stop & Shop), with traditional superstores (Super Stop & Shop) and specialty supermarkets (e.g., Whole Foods), and with only traditional superstores (Super Stop & Shop) stores. The existence of different pricing patterns among these varying market structures will be examined. Such patterns constitute a natural experiment that may reveal strategic pricing by traditional and nontraditional grocers.

The primary objectives of this thesis are to:

1) To infer pricing strategies of traditional natural/specialty food stores, superstores and non-traditional grocers through estimation of average price differences across product, store, community and market conditions.

2) To determine the effect of market structure on average organic grocery prices, holding demographics, product attributes and store conditions constant.

3) To utilize a summary of the effect of non-traditional grocers to infer the positive and negative effects of non-traditional grocers on both consumers and competing traditional grocers.

CHAPTER 2

THE LITERATURE

This chapter reviews the relevant literature on the mainstream movement of the organics market, specifically the organic produce market. The impacts of organic mainstreaming on agriculture, supply chain operations, competition and consumers are also detailed. This is followed by a brief summary of the practices of Wal-Mart and the emergence and effects of Wal-Mart Supercenters. The remaining sections of this chapter will discuss the resulting potential impacts on and determinants of supermarket prices.

What is Organic?

Organic agriculture is based on production processes free of artificial fertilizers, pesticides, and genetically modified organisms. Organic food products rely on ecologically based practices including biological pest management and composting (Progress 2005).

In October of 2002, the United States Department of Agriculture (USDA) implemented the national organic standards, which made it mandatory for organic farmers and distributors, who wished to label their products organic, to adhere to a uniform set of standards. The stated purpose of this certification program is to sustain and stimulate growth by assuring consumers that organic products meet consistent and uniform standards, as well as assuring producers of the ability to achieve price premiums and market share for certified organic products. The certification process is also assumed to increase the efficiency of the market by reducing the issue of asymmetric information (i.e., sellers know more about product quality than buyers) from producer to consumer (Lohr 1998). As consumer demand for organic foods continues to grow, high volume sales through mass retail outlets, like supermarkets, are rapidly replacing the direct farmer connection for organic consumers (USDA/NOP). For mass market consumers labeling like “certified organic” is relied on as food production processes are not easily observable (USDA/NOP). Therefore, consumers look to the national organic standards and third-party inspectors for assurance.

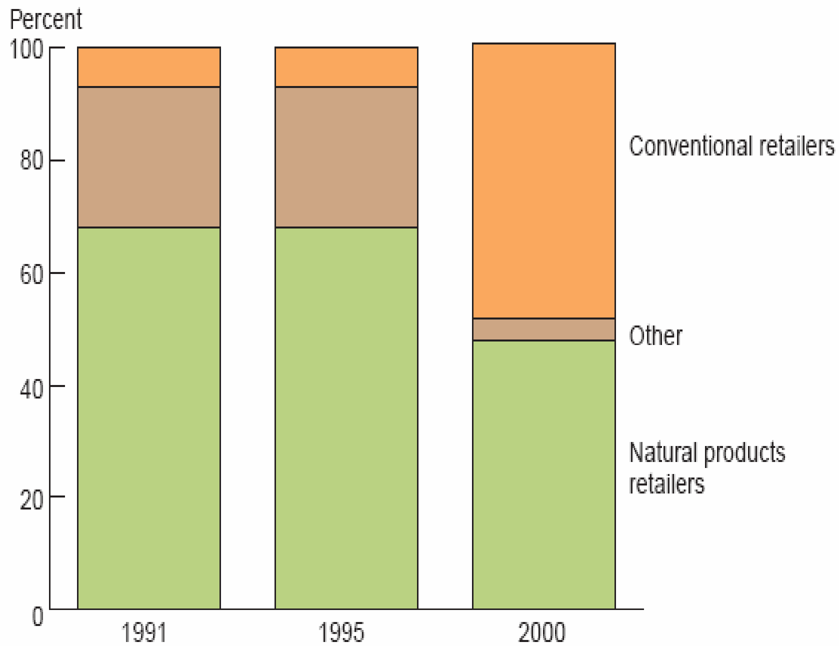
The term organic as recognized by the national organic standards can be broken into the following four main categories: “100% organic” products contain only organically produced ingredients; “organic” products contain 95 percent organically produced ingredients by weight; “made with organic ingredients” products contain more than 70 percent organic ingredients, where up to three of the organically produced ingredients can be specified on the principal display panel of the packaging; and processed products containing less than 70 percent organically produced ingredients. The latter category cannot use the term organic in the principal display panel, but the ingredients organically produced can be specified on the ingredients statement on the information panel (USDA/NOP).

The Mainstream Movement of the Organic Market

Organics are now available in 20,000 natural food stores and 73 percent of traditional grocery stores; they account for one to two percent of total food sales (Dimitri and Greene 2003). Approximately 800 new organic products were introduced in the first half of 2000 (Dimitri and Greene 2003).

Until 2000, natural food and specialty stores accounted for the largest amount of organic retail sales followed by direct market sales. Figure 1 shows that in 1991 only seven percent of total organic sales were sold by conventional retailers, including supermarkets and superstores, and 68 percent were sold by natural and specialty food markets (Greene and Dimitri 2003). By 2000, conventional retailers accounted for 49 percent of organic sales followed by 48 percent sold by natural and specialty food stores and only three percent by direct farmer's markets (other in figure 1). These figures were 47 percent, 44 percent and nine percent respectively in 2003. Approximately half of the $7.8 billion spent on organics in 2000 was in conventional supermarkets. Farmer's markets and other direct sales venues increased their market share to nine percent in 2003 (Greene and Dimitri 2003). The fast growth pattern in organic sales is expected to continue and many profit seeking companies will jump into the market.

Figure 1—Share of organic sales by venue



Notes: Other is direct sales and exports.
Source: *Natural Foods Merchandiser*, Packaged Facts.

Organic Produce

Fresh produce has consistently been an important component in the organic food sector as it is a "gateway" product group, meaning it is the first organic product purchased by consumers (Olberholtzer, Dimitri and Greene, 2005). Increasing consumer demand for organics has led to both traditional and non-traditional grocers adding organic fruits and vegetables to their shelves.

The leading revenue source for the U.S. organic food sector is produce. The Nutrition Business Journal states that organic produce accounted for as much as 42 percent of total U.S. sales of organic foods in 2003, at an estimated value of $4.3 billion. Within the organic produce sector, fresh produce accounted for the largest amount at 93 percent of total sales at $4.0 billion. Frozen, canned and dried produce each accounted for only 3 percent or less (Olberholtzer, Dimitri and Greene, 2005). In 2005, the organic produce sector generated total revenues of approximately $7 billion, amounting to 43 percent of the overall market value (B&CRC 2006). Furthermore, the Nutrition Business Journal projects sales of organic produce in 2010 could reach $8.5 billion. This would be an increase of more than 300 percent over sales of organic fruits and vegetables in 2000.

The top 11 fresh organic produce items purchased in the United States are tomatoes, romaine, spinach, carrots, red delicious apples, golden delicious apples, gala apples, potatoes, peaches, bananas, and squash (Olberholtzer, Dimitri and Greene, 2005). These top selling products, except for peaches due to seasonality, are the products analyzed for this thesis. Other high demand produce items include strawberries, beans, mushrooms, cantaloupe, celery, broccoli, and oranges.

In addition to increasing the availability of organic produce, retailers, predominantly traditional and non-traditional grocers, are also increasing the assortment to include packaged produce items (Dimitri and Greene 2003). From 2002-2003, the sales of packaged fresh produce increased to $364 million, the highest growth rate of all organic products at 26 percent. Conventional supermarkets, such as Super Stop and

Shop, accounted for 75 percent of this total. The number of new organic produce items has doubled from 14 in 1993 to 30 in 2003 (Oberholtzer, Dimitri, and Greene 2005).

The introduction of packaged organic produce items has led the way for the branding of fresh produce. The phenomenon of branding has become more evident as more and more producers are identifying their products with their farm name and logo. The most prevalent brands are Cal Organic, Pure Veg, and Earthbound Farms, which are all California based (Olberholtzer, Dimitri and Greene, 2005). Earthbound Farms is the nation's largest organic produce brand.

The importance of the organic food sector is further noted as it has sparked tremendous research by industry groups and academics. The primary focus of industry group research in this arena focuses on consumer behavior and preferences towards purchasing organic produce through consumer surveying. The Nutrition Business Journal (2003) examined usage and expenditure surveys in relation to retail and wholesale data to determine the degree to which consumers were buying organic products. The study concluded that only 2.4 percent of the U.S. population is frequent or heavy consumers of organic food. Frequent is defined by a consumer spending $50 a month and a heavy consumer is one who spends $200 a month on organic food.

The Whole Foods Market survey (2004) reports that 54 percent of U.S. consumers have at least tried organic foods and beverages and more than 25 percent claim they have consumed more organics in 2004 than in the previous year. Additionally, the survey indicates that one in every ten U.S. consumers consumes organic foods and beverages regularly or several times a week.

The Hartman Group's 1999 survey concluded that 3 percent of all consumers are "heavy" purchasers and 29 percent are "light" purchasers of organic food products. The survey revealed that organic fruits and vegetables fall within the top three most purchased organic products for both heavy and light consumers. Heavy consumers rated vegetables second and fruits third most purchased. Light users rated vegetables first and fruits second most purchased.

Consumer surveys were also used to identify important factors that influence the purchase of organic produce. For instance, Makatouni (2002) attempted to capture the motivations behind buying organic produce through consumer interviews. This study revealed that human, animal and the environment were the three leading motivating factors to buying organic produce. The Whole Foods Market survey (2004) reports the four leading factors behind purchasing fresh organic produce are environmental issues (58%), sustaining local agriculture (57%), health concerns (54%) and better quality (42%). The Hartman Group (1999) found health and nutrition (66%), taste (38%), food safety (30%) and the environment (26%) are the motivating factors for the purchase of organic food products by survey respondents.

Academic studies have utilized empirical analysis to complement the aforementioned surveys to examine the typical organic consumer and the inherent consumer choice model. Estes and Smith (1996) concluded that consumers consider price, size, packaging, cosmetic defects and whether the product is organic to be important in their purchasing of fresh produce.

Thompson and Kidwell (1998) also estimated the choice between organic and conventional produce, with a focus on produce price, cosmetic defects, consumer demographics and economic traits. They concluded that store choice had a significant impact on the probability of purchasing organic produce over conventional. Additionally, the authors determined that shoppers at specialty stores were more sensitive to price differences between organic and conventional produce items. Differences in cosmetic defects was statistically significant, but only had a small effect on the probability of purchasing organic produce items.

Agricultural Impacts

The movement of organics to the mainstream market is expected to have impacts on organic farmers and producer welfare. In response to changing supply and demand forces, farmers doubled organic cropland between 1992 and 1997, to 1.3 million acres and further to approximately 2.3 million acres in 2001 (Dimitri and Greene 2003). During the time period of 1992 to 1997 the number of organic growers increased by 40 percent. An estimated 80 percent of organic production came from family farms in 2002. Organic food products have earned price premiums over conventional (non-organic) food products, providing incentives for farmers to grow organic, at least in the short run (Oberholtzer, Dimitri and Greene 2005). However, the process of bringing organically grown food to the market is difficult as organic produce is highly sensitive to natural variations of weather and seasonality (Resnick 2003). Therefore, the assumed high profit margin associated with certified organic foods is not easily attainable.

The national standards implemented by the US government are criticized by some as favoring corporations as they are too expensive for the average, small farmer to afford. The fees charged by State and private certifiers represent an additional, ongoing expense in certified organic farming systems, which can be a financial burden for smaller farmers (Oberholtzer, Dimitri and Greene 2005). As a result once valued as being community and locally oriented, organic farming has taken on a corporate face (Resnick 2003). The New York Times reports that organic food is seen for its profit making potential. This has resulted in approximately five corporately owned giant farms being estimated to control half of the $400 million organic produce market in California, which is the largest organic produce market in the US. In fact, the majority of space dedicated to organic products in the average supermarket is dominated by corporately owned organic brands. Phil Howard, a researcher at the Centre for Agro-ecology and Sustainable Food Systems, notes that an estimated 40% of the packaged organic foods on the shelves of natural food stores are produced by some of the biggest companies in the world (Lindsay 2005). According to the New York Times, Hain which owns brands such as Bearitos (chips), Bread Shop (granola), Celestial Seasonings (tea), Garden of Eatin', Health Valley, Imagine Foods (Rice Dream), Terra Chips, and Westbrae (canned vegetables, soy drinks, pastas, and more) has principal stockholders like Phillip Morris (tobacco), Monsanto (genetically modified food), Citigroup (responsible for rainforest destruction), Exxon/Mobil, Wal-Mart, Entergy Nuclear, and Lockheed Martin (weapons manufacturer). In 1999 the H.J. Heinz Co., which is owned by the same principal stockholders as Hain, acquired ownership of nearly 20% of Hain (Resnick 2003).

This corporate phenomenon has been viewed as both a success and a failure. According to many critics, the acreage of organic farmland has increased but the core, community-oriented ideals of the organic movement, which were developed in response to industrial agriculture, have been slipping away raising the issue of organic integrity (Klonsky 1998). Organic agriculture is increasingly beginning to mimic global, industrial agriculture. Corporate farms are setting “organic” fields alongside conventional farming fields, including those which use genetically modified seeding practices (Klonsky 1998). An organic Canadian farmer was quoted saying, “Even though a 50-acre field of broccoli may not be sprayed with noxious chemicals, it is still monocropped, mechanically harvested and transported thousands of miles before it is eaten" (Lindsay 2005). The movement to industrial organic farming is likely to share the same negative impacts of loss of crop and seed diversity that conventional farming experienced. This has already become evident as Howard notes that many of the organic seed varieties are now available only through a giant seed company called Seminis, which was acquired by Monsanto in the beginning of 2005.

Critics argue that many of the small local farmers who brought the value of organic farming practices to public attention have been unable to survive the onslaught of corporate competition as organic growing has been industrialized and organic products have further developed in the mainstream market. Before supermarkets began stocking organic produce, it was bought either directly from farmers or from small local natural food stores (Lindsay 2005). A garlic farmer in British Columbia was reported saying, "The (supermarket) chains aren't interested in buying from small, local, seasonal producers anymore" (Lindsay 2005). It is more cost effective for retail food chains to purchase from large organic producing companies. Critics argue that large companies are able to undercut the small organic producers by selling one organic product at a low price by subsidizing it with a line-up of non-organic products (Lindsay 2005). Furthermore, most consumers do not distinguish between local and corporate organic foods. A common consumer attitude is if it's organic, it's good. This consumer attitude applies to foods shipped from Mexico or Europe, even though domestic products are available (Lindsay 2005). Many consumers' main concerns are finding the lowest possible price. These factors have raised concerns that the niche market for small organic farmers will potentially disappear.

Supply Chain Impacts

Organic food products, whether they are fresh or processed, pass through many different channels in a variety of ways as seen in Table 2 below. In some cases one firm may grow, process, package and ship their organic products. In other cases a firm grows the product or ingredient for a product, processed by another firm, packaged by a third firm, and shipped to its final destination by yet another firm (Oberholtzer, Dimitri and Greene 2005). After shipping, organic products can either be sold to retailers by a broker or delivered to a terminal wholesale market where they will then be sold to retailers. Organic produce, however, is typically sold to a specialty broker rather than a terminal wholesale market. It is important for organic food handlers, processors and retailers to adhere to standards to maintain the integrity of organic agricultural products. To maintain organic integrity, organic produce must be processed, stored and shipped separately from conventional produce at each stage of the supply chain. This can be a difficult challenge as farmers need to sell their perishable products as soon as possible after harvesting, while brokers and distributors need to get their fresh products to retailers just as quickly.

Organic food products were previously sold largely outside the traditional distribution channels through farm gate sales, open-air markets, specialized grocery shops, and natural product retailers (Kortbech-Olesen 2002). Most processing took place in small or medium sized companies rather than major food manufacturers. As organics have moved to the mainstream retail market, these traditional distribution channels have begun to change. According to the Washington Post, Wal-Mart is in the process of developing a national organic and fair trade program starting in Brazil. The initiative of the program is to purchase organic and fair trade products directly from farmer co-ops.

Table 2. Organic Product Supply Chains

Organic Fresh Fruits and Vegetables
Farm – shipper – wholesaler – conventional/natural foods retailer
Farm – shipper – specialty broker – retailer
Farm – shipper – conventional/natural foods retailer
Farm – consumer farmers markets, roadside stands, community supported agriculture
Processed Organic Foods
Farm – manufacturer – wholesaler – retailer
Farm – shipper/procurer – manufacturer – wholesaler – retailer
Organic Dairy Products
Farm – on-farm/off-farm dairy (pasteurize and bottle) – regional distributor – retailer
Farm – off-farm processors of cheese, butter, yogurt, or dry milk – distributor – retailer

Adapted from the USDA/ERS

It is known that fair trade and organic co-ops tend to have higher than average prices. Wal-Mart contests they will not pay more for these products than they deem necessary. However, the company was quoted saying they are willing to pay slightly higher than average prices because they will save money by bypassing the traditional layers of the distribution chain. Wal-Mart will make room for these new products by bumping pricier name brand products on their shelves. This is expected to allow Wal-Mart to buy products more cost effectively and ultimately sell them at lower prices. Additionally, Wal-Mart hopes to better their image with consumers by showing their support for organic and fair trade co-ops and sustainability.

Trade practices between produce shippers and retailers have gained national attention in the recent wave of supermarket mergers and the growth of new trade practices that have affected various industries, specifically the produce industry (Kaufman 2000). The USDA Economic Research Service has conducted thorough research on the emerging trade practices, trends and issues of the U.S. produce market including both conventional and organic produce. Retail consolidation has prompted concerns about whether retail buyers are exerting market power in their relationship with produce shippers, specifically reducing prices to shippers below competitive levels along with a growing incidence of fees and services (Kaufman 2000). Retailers argue that these new trade practices reflect their costs of doing business and the demands of consumers.

Impact on Competition

The Nutrition Business Journal states organic foods accounted for $10.4 billion (1.8 percent) of total US food retail sales in 2003. By 2010 organic food sales are predicted to increase to $23.8 billion or 3.5 percent of total retail US food sales. Presently the largest share of organic sales takes place through two major retailers: natural food stores and traditional supermarkets (Kortbech-Olesen 2002). Both retailers sell organic products but do so in a different manner. Natural food stores focus primarily on organic products and usually offer conventional products when organic product availability is limited (Kortbech-Olesen 2002). Traditional supermarkets differ by offering a limited selection of organic products usually alongside a vast assortment of conventional food products. More recently traditional supermarkets have developed their own organic product lines and departments.

In addition to selling their organic products under different formats, these major retailers also obtain their products through different channels. Natural food stores tend to not import their organic products, but rather obtain them through local or regional distributors (Kortbech-Olesen 2002). This way they maintain the original local community values tied to the organic movement. In contrast, traditional grocers obtain their organic products through direct importing at a higher rate.

The organic food sector has undergone a consolidation process through mergers and acquisitions. In the early 1980s mass market natural food stores, such as Whole Foods, capitalized on the rising demand for organic products, gobbling up local natural food stores (Warner 2005). Whole Foods is the largest and fastest growing grocery chain of natural and organic food products with 177 stores and 1 percent of the food market in the US. It has changed the landscape of supermarkets by pushing for more variety of organic foods (Warner 2005). To compete, conventional supermarkets reduced organic prices by subsidizing them with other products and direct importation of their organic products (Lindsay 2005). However, Lindsay argues that conventional supermarkets were too quick to do this without considering long run implications and cost structures. Organic food products cost more to produce and, if retailers squeeze farmers too tightly, corners will be cut and organic integrity will be compromised.

The advancement of organics to mainstream traditional supermarkets resulted in numerous studies focused on the demand impacts of organic foods. Most of the first studies done measured demand impacts through examination of consumer attitudes and choice models. A series of studies conducted by Glaser and Thompson were of the first to consider price and purchase data for estimation of changing demand for organic products (Thompson and Glaser 1998, 2000, 2001). The results supported the increasing demand for organic products and found that price premiums for organic foods were as much as 60 percent higher than for comparable conventional food products in some organic market segments at the supermarket level. The authors recognize a limitation in the amount of organic scanner data available as well as the limitation of not including natural food stores. This study along with numerous others suggests that price premiums for organic products have been maintained at the traditional supermarket level. The research at the traditional supermarket level is rigorous in its analysis comparing the organic food market to the conventional market. However, research needs to be taken a step further to explore the impacts of the increase in consumer demand and the inclusion of nontraditional grocers.

Wal-Mart Supercenters

The movement to a corporate organic retail face opened an important opportunity for not only traditional grocers but also for non-traditional grocers to gain some organic ground. Traditional grocers are losing market share as discount and other mass market formats grow. The average American made 95 trips to traditional supermarkets in 1996. In 2004 it dropped to 70 trips. From 1996 to 2004, annual trips to Wal-Mart jumped to 26 from 13 and Costco to 11 from 8 (Warner 2005). Wal-Mart operates 1,866 supercenters with grocery departments, which could triple by 2010 (Warner 2005). Target also plans to incorporate grocery departments into more of its stores. Twenty years ago traditional supermarkets held 90 percent of at-home food purchases. Now Wal-Mart, Costco and Target, all non-traditional grocery stores, have grabbed substantial market share with their consumer-enticing one-stop shopping image (Leibtag 2005).

In March 2006, Wal-Mart revealed it would double its organic produce and dairy selections. Wal-Mart is already the top U.S. grocery seller and the top seller of organic milk. Wal-Mart also offers organic products including baby food, juice, produce and pasta sauce, but the expanded offerings will include products ranging from pickles to macaroni and cheese (Health and Nutrition 2006). Wal-Mart is now testing 300 so-called "organic trait stores," across the country and is also in the process of rolling out 400-plus organic items across all departments in its stores, including food and nonfood items (McTaggart 2006). To compete, supermarkets are devoting as much as 30 percent of their floor space to organic, natural and specialty foods (Purcell 2006).

Wal-Mart's further development into the organics market is likely to drive more production of organic foods by manufacturers who generally have viewed organics as risky because of low market share, as well as among manufacturers that previously would not have dealt with retailers such as Wal-Mart (Health and Nutrition 2006). For instance the brand Nature's Path emphasized the importance of recognizing that 45 percent of the U.S. population shops at Wal-Mart, and they may not otherwise have access to organics (McTaggart 2006). By selling to Wal-Mart, Nature’s Path is servicing more than 145 million people they were not servicing before (McTaggart 2006). This allows their products to be available to everyone of every social and economic background.

As with other products, Wal-Mart has begun its mission to become the low-price leader in organics. Wal-Mart is executing its buying power and efficient supply chain tactics to drive down the price premiums on organics to be within 10 percent of conventional food products (McTaggart 2006). As stated above, numerous studies show Wal-Mart has contributed to reducing consumer prices. This effect of Wal-Mart has already made an impact on the UK organic food industry as supermarkets are fighting to reduce the price of organic food by further importing organic food products even when domestic products are available (Speveck 2006). This competitive strategy may make it less likely for small organic farmers to survive.

Impact on Competition

A standard assumption in most economic models is that a firm's primary objective is to maximize profit (Perloff 2005). As previously discussed, the organics market is seen to have profit making potential as demand has continued to grow at an increasing rate. Given the laws of supply and demand under perfect competition, firms will continue to enter a market or a specific market segment as long as there is potential to make profit. A firm will not enter if it is unprofitable to do so especially when barriers to entry are present. There are currently no entry restrictions in the organics market, in the sense that only a certain number of firms can exist and compete within the market. However, there are significant barriers or costs to entering the organic market. For example, certification is necessary for an organic farmer; adhering to the national organic standards is required and can be costly. Due to the associated risk and costs, changing from conventional to organic agricultural practices may be more easily attained by larger corporate farms (Resnick 2003).

Economic theory suggests that if an entry restriction is high enough to prevent entry to the level of perfect competition, prices will be sustained at a level exceeding marginal cost and average cost (Perloff 2005). The presence of large traditional grocers and Wal-Mart Supercenters in the organics market may present additional barriers to entry for retailers. Cost structures of the firms present in the organics market are unknown; however, it is common for large incumbent firms to hold cost advantages over potential entrants. Additionally, a 1992 study by Cotterill and Haller demonstrated the supermarket industry to be one inclined to use strategic barriers to entry, such as filling niche markets like organics and reducing retail prices. Interestingly in the organic retail market, Wal-Mart, which is specifically known for the large economies of scale it creates from its efficient supply chain operations and influential buying power, is the entrant. These economies of scale are not typically shared by the traditional incumbent grocers. Wal-Mart's entry into the organics market as in other industries has made it difficult for incumbent firms to compete and for the entry of potential competitors.

Theoretical and empirical work suggests that entry of a new firm leads to a decrease in market prices and the profits of incumbent firms (Volpe and Lavoie 2007). However, research has determined that the effects of entry into an industry are heavily dependent upon market conditions, such as competitiveness and number of incumbent firms (Volpe and Lavoie 2007). A 1991 study conducted by Bresnahan and Reiss demonstrated that in competitive markets the first and second entrants into an industry resulted in a price decrease, but additional entrants resulted in little or no price difference. However, their study assumed identical firms and Wal-Mart supercenters are considered to be quite different to conventional supermarkets (Volpe and Lavoie 2007). Further research by Marion, Heimforth and Bailey in 1993 specifically focused on the effects of supercenters and warehouse stores entering retail food markets. The authors concluded that supercenters and warehouse stores may enhance price rivalry among nearby competition because these stores behave strategically different from conventional grocers with a major emphasis on low price markups. Lower prices through competition may reduce barriers to entry imposed by incumbent grocers (Volpe and Lavoie 2007). However, the reduction in price through increased competition may also reduce the incentive to enter as the profit making potential of organics may diminish.

Over the past decade nontraditional grocers have chipped away at market share of traditional grocers. In the past five years Wal-Mart sold almost twice as much as Kroger's, the largest grocery chain. Wal-Mart began selling food in 1988 and by 2002 became the largest grocery chain in the US (Hausman and Leibtag 2005). Wal-Mart undercuts supermarket prices by as much as 20 percent, but manages to maintain significant profits because of its enormous volume, huge buying power and low labor costs, as its employees unlike those of most supermarkets are not unionized (Warner 2005). Traditional retail outlets have responded to the entry of Wal-Mart supercenters by reducing their prices and employee wages and benefits (Hausman and Leibtag 2005).

The impact of Wal-Mart on traditional food retailers has been the center of much discussion and research for the past several years. The Food System Research Group published a study measuring the impact of nontraditional food retailing supercenters on food price changes, with a specific focus on market concentration and market power (Sharkey 2006). The study confirmed that as the concentration within a market increases higher food prices are to be expected. However, the study could not conclude that the entry of supercenters into a market had a significant impact on food prices in metropolitan areas due to limitations in data (Sharkey 2006). The authors suspect that a smaller geographic breakdown of markets would reveal a more significant effect of supercenters on price.

Khanna and Tice (2000) examined how large chain stores respond to new entry of Wal-Mart discount stores in local markets through the comparison of markets with and without conventional Wal-Marts present. Consistent with previous research, the authors concluded that large, highly profitable incumbents responded aggressively through price competition to Wal-Mart's entry, while highly levered incumbents responded less aggressively. Among the incumbents who responded aggressively, the following three characteristics were present: 1) public ownership, 2) low levels of debt, and 3) little or no exposure to Wal-Mart in other regions. The success or failure of the incumbents' response was not discussed. However, Khanna and Tice suggest in addition to price incumbents also respond to Wal-Mart's entry through investment. For example, the incumbent may renovate, expand, or increase the number of current stores. Furthermore, the authors concluded that firms who previously competed with Wal-Mart were more likely to compete through investment rather than price.

This research reveals several important factors to consider when attempting to understand the effect of Wal-Mart's entry on the prices of competing supermarkets. Therefore the following factors should be considered to explain price reactions to the presence of a Wal-Mart Supercenter by different stores: the size of competing supermarkets, status of public or private ownership, level of debt incurred by incumbents, and the existence of previous exposure to competition with Wal-Mart (Volpe and Lavoie 2007).

Volpe measured the effect of Wal-Mart Supercenters on grocery prices in New England. He examined 12 geographic markets throughout New England collecting price data on national brand and private label goods for an identical market basket across traditional supermarkets and Wal-Mart Supercenters. The market basket included goods from all six major grocery departments – dairy, frozen food, grocery, health and beauty, meat, and produce. Volpe concluded the Wal-Mart Supercenters resulted in a price decrease of approximately 7 percent for national brand goods and approximately a 5 percent decrease for private label goods at conventional supermarkets within a five mile radius. The presence of Wal-Mart Supercenters results in the greatest price decreases in the grocery and dairy departments of conventional supermarkets. There was also evidence to suggest the presence of Supercenters results in price decreases in the frozen food and produce departments.

Additionally Volpe suggests that the presence of Wal-Mart Supercenters results in greater price variation among supermarkets with which it competes. Volpe offers two explanations for this result. First, the presence of Supercenters may reduce the ability of conventional supermarkets to coordinate pricing and promotional activities. Second is the presence of non-price competition as some competing supermarkets may compete with Wal-Mart through differentiating their service and product quality level. Therefore, greater price variation does not clearly suggest a positive or negative effect by the presence of Wal-Mart Supercenters. Moreover, Volpe concluded that regardless of market concentration, Wal-Mart Supercenters price their products significantly lower than conventional supermarkets.

Impact on Consumers

The impact of organics moving to the mainstream is also felt by consumers. The Whole Foods Market survey (2004) reveals the primary barrier to consumers trying organics is price. Almost 73 percent of respondents believed organics were too expensive. A 2006 study confirms this belief through the comparison of organic and conventional average grocery prices for meat, milk, fruits and vegetables and a few select pantry staple goods in Portland, Oregon. The study concluded that organics were priced approximately 77 percent higher than comparable conventional goods (Cole 2006).

Additionally, Oberholtzer, Dimitri and Greene (2005) analyzed price premiums for the expanding US organic produce market. This study emphasizes the significant and increasing growth of the organic produce market through the analysis of farm-gate and wholesale prices. They specifically looked at the pricing trends and market margins for broccoli, carrots and mesclun mix. They concluded organic wholesale price premiums for mesclun mix are narrowing, while wholesale and farm-gate premiums for broccoli and carrots remain strong. Oberholtzer, Dimitri and Greene (2005) indicate that organic prices and premiums have been already shown to have decreased but must decrease further to penetrate beyond the 2-3 percent level in the mainstream market.

The entry of Wal-Mart into the organics market is perceived to further decrease these price premiums as both theoretical and empirical evidence suggests Wal-Mart stores result in lower average prices in areas in which they operate. Global Insight 2005 conducted a statistical analysis that supports these findings. They concluded the expansion of Wal-Mart during the period of 1985 to 2004 was associated with a 9% decline in food-at-home prices, a 4% decline in commodity prices and a 3% decline in overall consumer prices as measured by the Consumer Price Index. Bianco and Zellner (2003) found that Wal-Mart Supercenters, as with conventional Wal-Mart stores, price their products significantly lower than competitors. Volpe (2005) concluded that, in addition to having lower prices, Wal-Mart Supercenters have also been shown to lower the prices of their competitors, having a positive effect on price sensitive consumers.

Most national studies suggest higher income consumers are more likely to purchase more organic products (Thompson 1998). Wal-Mart's entry may mean that consumers in lower income brackets have more opportunity to purchase organic products as they become more affordable.

Wal-Mart's enormous size and consistent innovation in distribution and inventory control efficiencies has allowed the firm the ability to buy in bulk. Moreover, Wal-Mart has been able to sustain substantial bargaining power with its suppliers by buying from many different firms over time to ensure the lowest possible price for its goods (Vance and Scott, 1994). Volpe (2007) discusses the ability of Wal-Mart to achieve low prices through bargaining as a demonstration of countervailing power. The concept of countervailing power is the ability of a retailer to offset the increasing market power of its distributor in order to extract wholesale price discounts resulting in a reduction in the distributor's markup (Snyder 2005). Chen (2003) demonstrates that an increase in the amount of countervailing power possessed by a dominant retailer, such as Wal-Mart, can lead to a reduction in average retail prices for consumers. A dominant retailer has market power and acts as a price setter. The presence of a competitive fringe, a set of small firms acting as price takers, is necessary for countervailing power to benefit consumers. The intuition behind this result is that in order for a distributor to cope with the loss due to the dominant firm's bargaining power, the distributor decreases the wholesale price to the firms among the competitive fringe as well. Thus, there is an overall reduction in price to consumers in the presence of a countervailing power under certain market conditions.

Some speculate that lower prices at Wal-Mart may not be a consumer benefit. The US Bureau of Labor Statistics reports that a price reduction may not in fact be a consumer benefit if along with a price reduction consumers also experience a reduction in service. Therefore, consumers are thought to pay less for less service. In contrast Hausman and Leibtag (2005) assert that the consumer benefit is felt through an indirect price effect: as the expenditures at a supercenter increase the prices of traditional grocers tend to decrease. Hausman and Leibtag conclude that consumers benefit from direct and indirect price effects of Wal-Mart Supercenter entry.

Competition in the Supermarket Industry

This section reviews the relevant literature on the level of competition in the supermarket industry. The relationship between market structure and grocery prices is vital in the formation of econometric models that aim to explain variations in food prices. Although there is limited research specifically on organic pricing patterns in relation to market structure, there is extensive research on conventional food prices in relation to market structure.

Several studies, Lamm (1981), Cotterill (1986), Marion (1998) and Yu and Connor (2002), have found positive relationships between concentration levels and retail food prices. Lamm (1981) examined the price-structure relationship by regressing the value of a market basket on concentration ratios for various numbers of food retailing firms. Cotterrill (1986) performed a similar study using the Herfindahl index to measure concentration and predict food prices. Both studies conclude prices are significantly and positively correlated with concentration in the local markets they analyzed. Cotterill determined the Herfindahl index, which is a measure of concentration calculated by summing the squares of the market shares of all competing firms in an industry, to be more effective in predicting prices than concentration ratios. Cotterill also determined that smaller supermarket chains and independent stores may have higher prices than larger, prominent supermarkets. Furthermore, Cotterill concluded prices are positively correlated with store size and capacity. Further research by Cotterill and Putsis in 2000 supports the earlier findings of a positive correlation between price and concentration.

Conflicting research shows that the relationship between market price and concentration may not always hold. Kaufman and Handy (1989) examined 616 supermarkets across 28 Metropolitan Statistical Areas (MSAs) and concluded there was no relationship between market concentration and retail food prices. The authors did suggest the use of MSAs could mask otherwise positive concentration-price relationships in areas that are large enough to have multiple submarkets. However, Geithman and Marion (1993) disagree with Kaufman and Handy's use of an average price measurement, suggesting that prices of identical products should be compared across stores and across markets. Furthermore, Geithman and Marion (1993) revealed that the supermarkets were notified by the researchers prior to data collection, which could have resulted in "adjusted" prices.

Newmark (1990) found negative, but insignificant, coefficients for four firm concentration in the analysis of market basket prices across 27 cities. Even though Newmark found no relationship between concentration and price, he did find a positive significant relationship between price and income. However, Yu and Connor (2002) suggest that Newmark's study contained measurement errors for both the dependent price variable and the independent variables. After Yu and Connor (2002) corrected the measurement errors, Newmark's data revealed a positive and significant concentration-to-price relationship.

A 1998 study conducted by Binkley and Connor examined the price-concentration relationships across different U.S. markets, while controlling for variables related to supermarket costs, such as labor cost and store size. The authors found evidence to suggest the nature of retail market competition affects different price groupings in different ways. For instance, concentration was found to affect price, negatively and insignificantly to price in store departments such as produce, dairy and meat, but positively and significantly in other grocery departments, especially dry goods. The authors concluded that store size was a significant predictor of grocery prices, as larger stores with more floor space tended to have lower prices than smaller supermarkets. Furthermore, Binkley and Connor (1998) determined that supermarkets reacted to warehouse store competition by lowering their prices.

The relationship between market structure and performance is important when analyzing the movement of organics to the mainstream market. The consolidation trend of supermarkets and the inclusion of Wal-Mart have resulted in an increase in market concentration in the retail food industry (Business Resource Center 2005). Economic theory and most research, as previously discussed, suggests that a premium would remain on organic products and be higher at higher levels of concentration. However, Wal-Mart is known to reduce prices and Volpe's research suggests that in the presence of Wal-Mart, regardless of concentration levels, grocery prices are lower. Therefore, when considering the links between structure, conduct and performance in the grocery industry, an increase in market concentration and the influence of market power may lead to lower prices possibly resulting from an increase in efficiency (Shy 1995).

Organic Integrity

As organic sales have moved into mainstream retail markets, conventional food industry corporations are becoming more involved with the organic movement. This may bring the integrity of organic quality into question with the transformation of the organic farming landscape. Movement to the mainstream market is important in securing the growth of the organic market sector in the long run as long as it does not compromise organic integrity. At least two primary issues are involved in discussing organic integrity: compliance to organic standards and maintaining the core values of the organic movement. In discussing compliance with standards, the national organic standards state that manufacturers, distributors, handlers and retailers "must perform due diligence to be sure that products they label and sell as organic are indeed organic" (USDA/NOP). Food retailers are responsible for maintaining the organic integrity of organic products, but they do not need to be certified under the USDA's standards in order to sell organic agricultural products (USDA/NOP). Consumers want high quality fresh products at low prices. Organic consumers want food that was not only grown organically but has also kept its organic integrity along its journey to the retailer. Organic consumers do not just consider price and quality, but also the perceived social and environmental benefits associated with buying organic (Dimitri and Richman 2000).

The maintenance of the core values of the organic movement is pertinent to the discussion of organic integrity. Under the USDA standards organic is organic, but is the foundation of the organic movement being compromised in the movement to the mainstream market? The increasing presence of conventional food processors in the organic industry is increasing debate among farmers, shoppers, and consumer advocates about whether the values of organic agriculture and the motives of corporate development can coexist (Mark 2004). The roots of the organic movement stemmed from the promotion of sustainable, community oriented farming practices. A common promotional logo was "Know your farmer, know your food". Organic foods once available only at local co-ops or local health food stores can now be found at Safeway, Albertsons, Kroger's and Wal-Mart. A significant and growing percentage of organic foods are marketed by corporations, whom critics argue are more often associated with the predations of agribusiness than with the ideals of sustainable agriculture (Mark 2004). Organic produce that could be grown locally, like potatoes, carrots or apples, is imported and/or trucked from thousands of miles away to arrive on supermarket shelves. Already, 85 percent of organic food in Canada is imported (Lindsay 2005). In the US, organic produce is the largest product group traded and the majority of it is domestic (Kortbech-Olesen 2002). However, a considerable portion (estimated at 10 percent) of organic foods are imported in the US today (Warner 2005). The exact value of imported organic produce is unknown but the USDA estimates between $1 and $1.5 billion in organic foods were imported between 2002 and 2003 (Oberholtzer, Dimitri and Greene 2005). All imported organics must meet US organic standards.

The advocacy group Organic Consumers' Association is concerned that Wal-Mart does not care about the principles behind organic agriculture and that outsourcing will lead to violation of organic standards and labor conditions contrary to what an organic consumer would consider equitable (Scheuer 2006). The goal of organic food production is healthier food and more environmentally sustainable practices. Some argue that this goal is undoubtedly linked to small, locally owned farms. Organic practices have evolved in small farming and some may prefer a local approach. However, organic agriculture is a type of farming practice and does not prohibit industrialized farming. According to one organic activist, there are important issues about protecting standards but the implementation of uniform standards opens the door to industrialization (Scheuer 2006). Industrialization allows more people to have access to organic foods, which may outweigh the value of the local-organic connection.

Maintaining the integrity of organic products is a pertinent issue as organics move further into the mainstream market. This thesis considers this issue in its discussion throughout; however, organic integrity will not be considered in the econometric analysis.

Summary

The impacts on organic agriculture, supply chain operations, the retail sector, consumer welfare and organic integrity are significant to the discussion of the organic mainstream movement and to the understanding of its potential ramifications. This thesis will focus specifically on these impacts in the retail market including on the competitiveness of the retail market and the expected Wal-Mart effect. The primary objective will be to analyze the impact of market structure on performance in the retail organic market. Performance will be examined through analysis of retail price in relation to product, store, community and market conditions. Moreover, a summary of the effect of non-traditional grocers will be used to infer the positive and negative effects of non-traditional grocers on both consumers and competing traditional grocers.

CHAPTER 3

THE DATA

Primary Price Data

This section describes the price data collected for the empirical analysis of this thesis. Problems encountered in the data collection process are also detailed. Descriptive statistics of the raw price data are included.

It was necessary to collect primary data as Wal-Mart does not participate in any syndicated data services. Data on pricing and merchandising were collected over 10 days in early 2007 for fourteen organic produce items. The top eleven products were surveyed including grape tomatoes, large red tomatoes, baby carrots, butternut squash, romaine lettuce, baby spinach, red delicious apples, golden delicious apples, gala apples, brown russet potatoes and bananas. These produce items were selected for being the most frequently purchased organic produce items in the U.S. according to a 2005 report provided by the Economic Research Service of the USDA. The remaining three produce items are strawberries, green bell peppers and celery. These were selected on the basis of pesticide use. The intuition behind this selection is that consumer demand would be higher for organic produce due to concern about high levels of pesticide use. Price data were collected for all fourteen products across all brands available at each retail location.

The price data were collected directly from the shelves of 37 food retail stores including Wal-Mart Supercenters, Super Stop & Shops, Whole Foods, Trader Joe’s, and Wild Oats stores in Connecticut, Massachusetts, New Hampshire and Rhode Island. The stores were selected from a sample of 17 New England micro-markets across varying market structures. These micro-markets were formed from New England metropolitan statistical areas as defined by the US Census. The sampling frame of these markets is displayed in Table 3.

Micro-markets to be sampled were chosen to capture four naturally occurring market structures. Table 3 shows the four market structures: 1) markets with all store types present (traditional, non-traditional and natural/specialty), 2) markets with non-traditional (Wal-Mart) and traditional (Super Stop & Shop) stores present, 3) markets with conventional (Super Stop & Shop) and specialty (e.g., Whole Foods) stores present, and 4) markets with only traditional (Super Stop & Shop) stores present. These four market structures are shown in Table 3 below.

Table 3: Example of Proposed Markets to Examine

Food Store Type	Market 1	Market 2	Market 3	Market 4
Traditional [a]	X	X	X	X
Non-Traditional [b]	X	X		
Natural/Specialty Food Store	X		X	

[a] Refers to supermarkets and superstores

[b] Refers to Wal-Mart Supercenters, wholesale clubs and warehouse stores

Table 4 shows the 17 New England micro markets studied and the stores where data was collected in each. Only the metropolitan statistical areas in the four New England states studied containing the above stated food retailers were considered. Based on the geographic location of the food retailers within the metropolitan statistical areas, micro-markets were formed. The geographic location of each food retailer was determined using the ReferenceUSA database.

Table 4. Retail Store Sampling Frame

Market Structures	Structure Description	Statistical Metropolitan Area	Micro Market	Store Breakdown
1	Non-Traditional, Traditional and Specialty	Springfield, MA	Ware, MA	1 Wal-Mart 1 Whole Foods 1 Trader Joe's 2 Super Stop & Shops
2	Non-Traditional and Traditional	Haverhill-North Andover, MA-NH	Epping, NH	1 Wal-Mart 1 Super Stop & Shops
		Lawrence-Methuen, MA-NH	Methuen, MA	1 Wal-Mart 1 Super Stop & Shops
		Taunton, MA	Raynham, MA	1 Wal-Mart 1 Super Stop & Shops
		Norwich-New London, CT-RI	Westerly, RI	1 Wal-Mart 1 Super Stop & Shops
3	Traditional and Specialty	Framingham, MA	Frammingham, MA	1 Whole Foods 1 Trader Joe's 1 Super Stop & Shops
		Hartford-West Hartford, RI	West Hartford, CT	1 Whole Foods 1 Trader Joe's 1 Wild Oats 1 Super Stop & Shops
		Lynn-Peabody, MA	Swampscott, MA	1 Whole Foods 1 Trader Joe's 1 Super Stop & Shops
		Worcester, MA	Worcester, MA	1 Trader Joe's 1 Super Stop & Shops
		Bridgeport, CT	Greenwich, CT	1 Whole Foods 1 Trader Joe's 1 Super Stop & Shops
		Boston, MA	Hingham, MA	1 Whole Foods 1 Super Stop & Shops
		Providence, RI-MA	Providence, RI	1 Whole Foods 1 Super Stop & Shops
4	Traditional	Manchester, NH	Manchester, NH	1 Super Stop & Shops
		New Bedford, MA	New Bedford, MA	1 Super Stop & Shops
		New Haven, CT	Old Saybrook, CT	1 Super Stop & Shops
		Pittsfield, MA	Pittsfield, MA	1 Super Stop & Shops
		Waterbury, CT	Waterbury, CT	1 Super Stop & Shops

Each geographic micro market was formed within a 15 mile diameter. According to Cotterill (1986), a geographically competitive market has been defined as being five miles in diameter, as consumers are known to typically shop within five miles of their residence. However, critics speculate and I hypothesize that organic shoppers are willing to travel outside of the typical five mile diameter for a specialty product.

Issues with Data Collection

Two of the micro-markets, both in Connecticut, from the original sample containing Wal-Mart Supercenters did not carry produce. Therefore, two additional micro-markets containing Wal-Mart Supercenters were sampled to ensure each of the market structures were equally sampled. (Table 4 shows the actual markets sampled.)

The availability of individual commodities was not consistent across all store formats. Some food retailers carried multiple products for various produce items. In contrast, other stores had limited or no availability of some produce items. Therefore, it is important to note the number of observations per produce item does not equal the number of stores. This is true among the three types of food retailers considered. Wal-Mart Supercenters is the only food retailer to not carry certain produce items across all locations sampled. Wal-Mart Supercenters did not carry strawberries, green bell peppers, and butternut squash. There was also limited availability of large red tomatoes, baby carrots and bananas across the Wal-Mart Supercenters sampled. Butternut squash was the only product that was not widely available across all stores sampled. Therefore, it was dropped from regression analysis for lack of observations, which would result in a problem of degrees of freedom. Thus thirteen produce items are analyzed in the regression analysis.

Brands were also inconsistent across store formats. This is due in part to branding being a relatively new phenomenon within the organic produce market. Stop and Shop has developed its own store brand, Nature's Promise, for its organic produce and carries that brand predominately. Wal-Mart Supercenters carried only branded and prepackaged produce, which included more name brand items, like Earthbound Farms and Newman's Own. The Specialty stores carried a slew of brands, from farm branded to name brand produce items. Brand information was collected for each produce item sampled. As suspected, the null hypothesis of homogeneity among brands for each product was not rejected. Therefore there is no private label versus branded produce dynamic in the following analysis.

Additionally, quality is not homogenous across the three store formats. For instance, produce sold at Whole Foods stores specifically looked as if it had been polished to perfection. This was not typically the case at Super Stop and Shops and Wal-Mart Supercenters. Moreover, bruising and imperfections were not recorded. Therefore, it is important to note that quality is not controlled for.

Price per weight for all products was not consistent from store to store. This is due to differences in merchandising. For example, organic potatoes were sold individually or in bulk or both at some stores. Wal-Mart Supercenters tended to carry its produce in bulk, whereas Super Stop and Shops and Specialty stores tended to sell organic produce individually and in bulk. This phenomenon is true for all produce items sampled, except strawberries and baby carrots, which were consistently packaged across all stores. To resolve this issue, price information was collected for all organic products sold individually and in bulk from each location sampled. Furthermore, all prices were transformed to a dollar per pound measure for consistency.

Descriptive Statistics

Table 5 reports the average price per product across each store format. Observations from Whole Foods, Wild Oats and Trader Joe's are aggregated in a Specialty store category. Given previous research, it is hypothesized that Wal-Mart Supercenters would generally have lower prices than Super Stop and Shop and Specialty stores. Expectations about price differences between Super Stop and Shop and Specialty stores are uncertain, but I would expect Super Stop and Shop stores to have lower prices.

Table 5 reveals that overall Wal-Mart Supercenters have lower prices than Specialty and Super Stop and Shop stores for organic produce using one tailed t-tests. For all products, except for tomatoes, baby carrots, romaine lettuce, baby spinach and gala apples, the prices at Wal-Mart Supercenters are less statistically significant than those of Specialty stores. The products with the greatest statistical average price differences between Wal-Mart Supercenters and Specialty stores are celery ($0.55/lb.) and red and golden delicious apples ($0.50/lb.). Additionally, several other products such as bananas and potatoes exhibit more than a $0.40 average price difference per pound between the two store formats.

Wal-Mart Supercenter prices are also statistically significantly lower than those of Super Stop and Shop for all products except for grape tomatoes, baby carrots, romaine lettuce, and celery. The products with the greatest statistically significant average price difference between Wal-Mart Supercenters and Super Stop and Shops are large red tomatoes ($1.20/lb.) and baby spinach ($1.25/lb.).

The only products for which Wal-Mart Supercenters have higher prices than the other store formats is for grape tomatoes and baby carrots. Neither of these results is statistically significant. However, this result could be due to the fact that Wal-Mart

Supercenters carry baby carrots that are double packaged, individual snack size packages are contained within one big package.

Table 5. Descriptive Statistics for Retail Price per Pound by Product and Store Type

	Large Tomatoes	Grape Tomatoes	Baby Carrots	Butternut Squash	Romaine Lettuce	Baby Spinach	Potatoes
Mean							
(1) Wal-Mart Supercenters	2.97	3.40	3.92	NA	5.55	8.34	0.52
(2) Specialty	3.56	3.16	1.86	1.56	7.36	8.19	0.93
(3) Super Stop And Shop	4.17	3.28	2.10	1.49	6.67	9.59	0.84
Standard Deviation							
(1)	NA	0.62	3.16	NA	6.11	0.43	0.11
(2)	1.32	0.88	0.30	0.20	4.44	1.75	0.41
(3)	0.40	0.55	0.39	0.00	3.12	0.79	0.09
CV							
(1)	NA	18.24	80.61	NA	110.09	5.16	21.24
(2)	37.08	27.85	16.13	12.82	60.33	21.37	44.09
(3)	9.59	16.77	18.57	0.00	46.78	8.24	10.71
Price Difference (Pair wise t-tests)							
(1) & (2) *one tail*	0.59	-0.24	-2.06	NA	1.81	-0.15	0.41***
(1) & (3) *one tail*	1.20***	-0.12	-1.82	NA	1.12	1.25***	0.32***
(2) & (3) *two tail*	0.61***	0.12***	0.24***	0.07	0.69**	1.4***	0.09**
	Golden Delicious	**Red Delicious**	**Gala**	**Bananas**	**Straw-berries**	**Green Bell Peppers**	**Celery**
Mean							
(1) Wal-Mart Supercenters	1.66	1.66	1.50	0.69	NA	NA	2.60
(2) Specialty	2.16	2.16	1.77	1.14	8.60	5.11	3.15
(3) Super Stop And Shop	1.84	1.83	1.84	0.97	7.65	7.98	2.91
Standard Deviation							
(1)	0.00	0.00	0.29	0.76	NA	NA	0.22
(2)	0.56	0.49	0.84	0.40	2.23	1.53	0.97
(3)	0.26	0.28	0.26	0.05	0.76	0.00	0.47
CV							
(1)	0.00	0.00	19.33	110.14	NA	NA	8.47
(2)	25.93	22.69	47.46	35.09	25.93	29.94	30.79
(3)	14.13	15.30	14.13	5.15	9.94	0.00	16.15
Price Difference (Pair wise t-tests)							
(1) & (2) *one tail*	0.50***	0.50***	0.27	0.45***	NA	NA	0.55**
(1) & (3) *one tail*	0.18***	0.17***	0.34**	0.28***	NA	NA	0.31
(2) & (3) *two tail*	0.32**	0.33**	0.07	0.17	0.95	2.87***	0.24

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Table 5 also displays the coefficient of variation of price per product across the three store formats. The coefficient of variation measures relative variability and is calculated by dividing the sample standard deviation by the sample mean. Wal-Mart Supercenters demonstrate low relative variability, except for baby carrots, romaine lettuce, and bananas. This implies that Wal-Mart prices its goods relatively consistently across store locations. Super Stop and Shop prices also show low relative variability, except for romaine lettuce. In contrast, Specialty store prices exhibit high relative variability. This is expected as this category (Specialty) encompasses three different chains whereas the others are homogeneous.

Tables 6a – 6b, respectively, report the average price of Super Stop and Shops and Specialty stores in the presence of a Wal-Mart Supercenter. As shown in Table 6a, tomato prices at Super Stop and Shop are statistically lower in markets where a Wal-Mart Supercenter is present. There are no other statistical differences in price for the other Super Stop and Shop produce products.

Table 6a. Super Stop and Shop's Average Price across Markets with and without a Wal-Mart Supercenter Present

	Supercenter	No Supercenter	Price Difference
Tomatoes	3.99	4.62	0.63**
Grape Tomatoes	3.23	3.27	0.04
Baby Carrots	1.99	2.20	0.21
Butternut Squash	1.49	1.49	
Romaine Lettuce	6.94	6.52	0.42
Baby Spinach	9.71	9.51	0.20
Golden Delicious	1.82	1.86	0.04
Red Delicious	1.79	1.86	0.07
Gala	1.82	1.86	0.04
Potatoes	0.86	0.82	0.04
Bananas	0.97	0.97	
Strawberries	7.69	7.62	0.07
Bell Peppers	7.98	7.98	
Celery	2.79	2.99	0.20

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Table 6b shows a statistically significant reduction in price for tomatoes, romaine lettuce, and potatoes at Specialty stores in the presence of a Wal-Mart Supercenter. Tomatoes sold at Specialty stores in markets with a Wal-Mart Supercenter present are priced 42 percent, approximately $1.50, less than those sold in a market where a supercenter is not present. This phenomenon is similar for romaine lettuce and brown russet potatoes, which are priced 40 percent and 21 percent lower respectively at Specialty stores with a Wal-Mart Supercenter present within its micro market.

Table 6b. Specialty Store Average Price across Markets with and without a Wal-Mart Supercenter Present

	Supercenter	No Supercenter	Price Difference
Tomatoes	2.15	3.69	1.54**
Grape Tomatoes	3.35	3.12	0.23
Baby Carrots	1.88	1.86	0.02
Butternut Squash	1.49	1.57	0.08
Romaine Lettuce	4.51	7.62	3.11**
Baby Spinach	7.92	8.25	0.33
Golden Delicious	2.49	2.14	0.35
Red Delicious	2.49	2.13	0.36
Gala	1.74	1.77	0.03
Potatoes	0.75	0.96	0.21*
Bananas	1.14	1.14	
Strawberries	11.96	8.12	3.84
Bell Peppers	5.38	5.08	0.30
Celery	2.84	3.19	0.35

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Summary

Aligning with the hypothesis of this thesis, the descriptive statistics reveal there are statistically significant differences in prices across the three different store formats. Depending on the produce item there are some statistically significant differences across different market structures where a Wal-Mart Supercenter is present or not. The following chapter estimates the drivers behind these differences in terms of product, store, community and market level attributes.

CHAPTER 4

THE MODEL

The empirical goal of the regression analysis of this thesis is to estimate price differences of 13 organic produce items across varying store formats and market structures. The price differences will be interpreted in terms of product, store, community and market level attributes. Another goal is to isolate the effect of the presence of Wal-Mart Supercenters on prices at traditional grocers, including conventional supermarkets and specialty stores.

The theoretical results and descriptive statistics from the previous chapters are used as the foundation for the model developed. First, the model is presented followed by a discussion of the variables used in the analysis. Then the summary statistics and hypothesized signs of the variables used in the estimation process are displayed. The analysis examines retail price changes in organic produce across 17 different micro-markets in New England. The model estimates the impact of product, store, community and market attributes on the retail price of 13 organic produce items. The model uses the form: $Y = \alpha + \beta_i V + \beta_i W + \beta_i X + \beta_i Z + e$ where Y is the retail price of organic produce item i, V is a vector of product attribute variables, W is a vector of store level variables, X is a vector of community level variables and Z is a vector of market level variables suggested by economic theory to explain organic produce prices.

Variables Used in the Model

The empirical model for the price of an organic produce item *i* (*i* = type of product for each of the 13 products) in relation to product, store, community and market level attributes is expressed as follows (see table 7 for a summary of variables used):

$$P_i = \beta_0 + \beta_2 PACKAGE + \beta_3 LAYOUT + \beta_4 WALMART + \beta_5 STOPSHOP$$
$$(1) \quad + \beta_6 OVERONE + \beta_7 POVERTY + \beta_8 AA + \beta_9 HISPANIC + \beta_{10} ASIAN + \beta_{11} MKT2$$
$$+ \beta_{12} MKT3 + \beta_{13} MKT4 + u$$

Table 7. Summary Statistics for Independent Variables

	N	% of Sample
Packaging		
Tomatoes	28	25.0%
Grape Tomatoes	47	96.0%
Baby Carrots	43	100.0%
Romaine Lettuce	47	89.0%
Spinach	50	92.0%
Golden Delicious	48	52.0%
Red Delicious	47	51.0%
Gala	55	51.0%
Potatoes	42	93.0%
Bananas	34	59.0%
Strawberries	25	96.0%
Green Bell Peppers	25	84.0%
Celery	35	94.0%
Wal-Mart	74	12.0%
Stop and Shop	74	49.0%
Specialty	74	39.0%
Layout	74	38.0%
Over One	74	85.0%
Market 1	74	15.0%
Market 2	74	24.0%
Market 3	74	43.0%
Market 4	74	12.0%
Concentrate	74	55.0%
Supercenter	74	21.0%

	N	Mean	Standard Deviation	Minimum	Maximum
AA	74	3.51%	3.44%	0.40%	11.03%
Hispanic	74	6.15%	7.76%	0.75%	33.51%
Asian	74	2.57%	1.93%	0.54%	7.60%
Poverty	74	7.17%	4.62%	3.37%	22.42%

Table 8. Variables Used in Models (1) – (3)

Variable	*Description*	*Expected Sign*
Product Level		
PACKAGE	Dummy equal to 1 if the product is packaged.	-
Store Level		
WALMART	Dummy equal to 1 if the product is from a Wal-Mart Supercenter.	-
STOPSHOP	Dummy equal to 1 if the product is from a Super Stop and Shop.	-
LAYOUT	Dummy equal to 1 if the store has separate organic produce sections.	+/-
OVERONE	Dummy equal to 1 if the store has more than 100 employees.	+/-
Community Level		
AA	The percentage of African Americans in the city or town of the sampled store location.	-
HISPANIC	The percentage of Hispanics in the city or town of the sampled store location.	-
ASIAN	The percentage of Asians in the city or town of the sampled store location.	-
POVERTY	The percentage of the population below the poverty line in the city or town of the sampled store location.	-
Market Level		
MKT2	Dummy equal to 1 if the store sampled is in this market type.	-
MKT3	Dummy equal to 1 if the store sampled is in this market type.	+/-
MKT4	Dummy equal to 1 if the store sampled is in this market type.	+/-
CONCENTRATE	Dummy equal to 1 if the store sampled is in a market with less than three competitors.	+/-
SUPERCENTER	Dummy equal to 1 if the store sampled is in a market with a Wal-Mart Supercenter present.	-

PACKAGE is a binary variable intended to capture the variations in price due to the product attribute of whether the produce item is packaged or not. Previous research reveals that packaging has been shown to lower handling costs and in turn reduce the retail price of fresh produce (Simmons 1949; Williams et al. 1982; Calvin et al. 2001). Therefore, this variable is expected to be negative. Typically, Wal-Mart Supercenters carry only prepackaged organic produce and Super Stop and Shop stores carry predominately prepackaged organic produce.

It is important to note that firms not only compete through price, but also along many other product and store dimensions such as service, quality, research and development and promotional activities (Perloff 2005). In addition to collecting price data, store attribute mixes will be delineated and examined in an attempt to capture non-price competition. Some stores have a larger variety of organic products than others. The way a store has dedicated store space to their organic selection may be an important attribute in contributing to pricing patterns. Some stores dedicate an entire department to organic products while others sell their organic products alongside conventional products throughout the entire store. This is measured through *LAYOUT*, a binary store attribute that indicates whether the store dedicates separate sections to organic produce items or integrates its organic produce with its conventional produce. This variable takes on a value of 1 if the store sells organic produce items in separate sections. A separate section is defined by at least a separate kiosk (presentation area). A *LAYOUT* variable for a store takes a value of one only if at least fifty percent of the organic items sampled are on kiosks separate from conventional products.

It maybe important to capture price variation due to store type, as the merchandising of organic produce differs between store formats. *WALMART* and *STOPSHOP* are binary store attribute variables depicting the store type from which the organic produce item was sampled. The reference category is the Specialty store type, the third and final store type sampled.

OVERONE is a binary store attribute variable representing store size. It takes on a value of 1 if the store from which the produce item was sampled has more than one hundred employees. These data were collected from a 2007 database service, ReferenceUSA. Store size is important to consider as previous research has found that store size can impact prices in two different directions (Binkley and Connor 1996; MacDonald and Nelson 1991). Larger stores typically provide more products and services, as well as more employees, contributing to higher prices. However, larger stores can experience economies of scale resulting in lower prices to consumers. Therefore, the estimated effect of this variable may be positive or negative. Moreover, Supercenters are expected to have the lowest prices as they are the largest stores sampled (Volpe and Lavoie 2007).

The next set of variables are community characteristics that reflect demand factors. Community demographics may also be important in explaining pricing differences. Community demographics such as income should be considered because consumers may become less price sensitive as income increases (Hoch, Kim, Montgomery, and Rossi, 1995). Moreover, consumers with annual incomes greater than $60,000 are more likely to choose conventional supermarkets over discount stores such as Wal-Mart (Palma, Emerson, and House, 2003). Unlike other price-concentration studies, Newmark (1990) included household income in his econometric analysis, which proved to be significant and positively related to prices. He concluded that household income actually accounted for 60 percent of the variation in prices for his data. The income data collected for this study had relatively low variability and therefore held no significance in explaining changes in the retail price of organic produce across different submarkets. In this study, the variable *POVERTY* was used, which depicts the percentage of the population below the poverty line in the submarket where the store is located. The estimated effect of the variable *POVERTY* is expected to be negative. These data were collected from the 2005 American Community Survey of the US Census.

Hoch, Kim, Montgomery, and Rossi (1995) determined that certain minority groups, specifically African Americans and Hispanics, are more sensitive to grocery prices. Three variables are included, *AA*, *HISPANIC*, and *ASIAN*, measuring the percentage level of specific ethnic populations in the submarket of the store location sampled. The estimated effects on organic prices are expected to be negative.

Finally, to examine the relationship between price and market structure, market level attributes are considered. *MKT2*, *MKT3*, and *MKT4* (see table 3) are binary variables depicting the type of market structure for the store location. *MKT1* is used as the reference category. Equation (1) is estimated for each product of the 13 products sampled to prevent a loss of statistical importance for factors due to the aggregation of products.

Two alternative specifications of the market level attribute are also estimated. Equation (2) below substitutes a *CONCENTRATE* variable for *MKT2*, *MKT3* and *MKT4* to measure market structure impacts on price. *CONCENTRATE* is a binary variable, which takes on a value of 1 for stores in markets with fewer than three competitors. This variable captures the number of competitors within the market sampled, including all other food retailers such as Shaws, Big Y, Hannaford, Price Chopper and Market Basket. This model attempts to measure the impact of the shear number of competitors versus the type of competitors present in a market.

$$\begin{aligned} P_i &= \beta_0 + \beta_2 PACKAGE + \beta_3 LAYOUT + \beta_4 WALMART + \beta_5 STOPSHOP \\ &+ \beta_6 OVERONE + \beta_7 POVERTY + \beta_8 AA + \beta_9 HISPANIC + \beta_{10} ASIAN \\ &+ \beta_{11} CONCENTRATE + u \end{aligned} \tag{2}$$

The second alternative specification (Equation (3)) attempts to estimate the impact of the presence of Wal-Mart Supercenters on organic produce prices in Equation (3) below. This equation uses the market attribute variable *SUPERCENTER*, which is a binary variable taking on the value of 1 for stores in markets with a Wal-Mart Supercenter present. This model is estimated for Super Stop and Shop and Specialty store prices separately. Therefore, the indicator variables for store type are not included in this model.

$$\begin{aligned} (3) \qquad & P_i = \beta_0 + \beta_2 PACKAGE + \beta_3 LAYOUT + + \beta_6 OVERONE + \beta_7 POVERTY + \beta_8 AA \\ & + \beta_9 HISPANIC + \beta_{10} ASIAN + \beta_{11} SUPERCENTER + u \end{aligned}$$

The dependent variables used in the estimations of equation (1) – (3) are the raw price data transformed to a consistent price per pound measure for each of the 13 organic produce items sampled. Price indexes used in previous research are not necessary here because there is no aggregation of prices across commodities and produce is the only store department considered.

Summary Statistics of Independent Variables

Table 7 displays the descriptive statistics for the independent variables included in the model. Regarding product attributes, packaging is not included in the model estimated for baby carrots because 100 percent of the organic baby carrots sampled were prepackaged. The store level variables are biased as a result. Similarly, the majority, more than 80 percent of grape tomatoes, romaine lettuce, spinach, brown russet potatoes, strawberries, green bell peppers and celery were also prepackaged.

The store level variables are broken down as follows, only 12 percent of the products sampled came from Wal-Mart Supercenters. 49 percent came from Super Stop and Shops and 39 percent were sampled from Specialty grocers (including Whole Foods, Wild Oats and Trader Joe's). Nearly 40 percent of the products came from stores dedicating separate sections to organic produce. An overwhelming 85 percent of the products were sampled from stores with more than one hundred employees.

Considering the market level variables, 15 percent of the products were sampled from stores in market structure 1 (all three types of grocers), 24 percent were sampled from stores in market 2 (Super Stop and Shops and Wal-Mart Supercenters), 43 percent came from stores in market 3 (Super Stop and Shops and Specialty grocers) and 12 percent were from stores in market structure 4 (only Super Stop and Shops). 55 percent of the organic products were sampled from stores in markets with less than three competitors present. Only 21 percent of the products were sampled from stores with a Wal-Mart Supercenter present.

The typical market sampled had a population comprised of 3.5 percent African Americans, 6.2 percent Hispanics, 2.5 percent Asians and 7.2 percent of individuals who were below poverty. The percent of Hispanics has the highest variability across markets. The number of African Americans and the amount of individuals below poverty varied moderately across the respective markets. However, there is relatively low variability in the percent of Asians across markets sampled.

Table 8 shows the hypothesized expected signs of the independent variables included in all three models. The individual variables are displayed across the four levels of attributes: product, store, community and market conditions.

CHAPTER 5

RESULTS AND DISCUSSION

This chapter presents the estimation results for the three empirical models discussed in the previous chapter. The tests performed to determine whether statistically significant price differences occur due to store type and market conditions are also detailed in this chapter.

Equations (1) – (3) were estimated for each of the 13 organic produce products using ordinary least squares (OLS) regression techniques. For ease of interpretation, Tables 9-12, present the regression results using a log-log transformation. The linear OLS regression results are reported in the appendix. In all the tables, the three equations discussed in the previous chapter are depicted by models 1, 2 and 3. Subsequent tests were performed to determine if collinearity or heteroscedasticity presented a problem in the data.

As shown in tables 9 and 10, the explanatory power for Models 1 and 2 are statistically significant at the one percent level for all products except grape tomatoes, which is significant at the five percent level, and baby carrots, which is insignificant.

Model 3, which attempts to capture the impact of the presence of Wal-Mart Supercenters on Super Stop and Shop and Specialty store prices separately, did not perform as well. Table 11, reporting the results of Model 3 applied to Super Stop and Shop stores only, shows the explanatory power to be statistically significant at the one percent level for red delicious, golden delicious and gala apples. Table 12, which shows the results of Model 3 applied to Specialty stores shows the explanatory power to be statistically significant at the one percent level for gala apples and potatoes, at the five percent level for red delicious apples and celery, and at the ten percent level for romaine lettuce. The R^2 values range between 22-90% for Model 1, 24-88% for Model 2 and 30-87% for Model 3 for the products for which the model explained statistically significant amounts of the price variation.

Two measures were utilized to search for collinearity among the explanatory variables in the models. The first are variance inflation factors (VIFs); a VIF above 10 suggests the presence of problematic collinearity among the explanatory variables. All of the VIFs were below ten for all models, suggesting collinearity is not a problem. Condition indices were also used to search for problems of collinearity between the explanatory variables in the model. Condition indices are formed using eigenvalues, which measure the variance of linear combinations among the explanatory variables. Condition indices above the benchmark of 25 suggest a presence of collinearity among the explanatory variables. All of the condition indices were below the benchmark and suggest there is no problem of collinearity among the explanatory variables.

White's test for heteroscedastic variances were performed for all estimated models. The null hypotheses of homoscedasticity were not rejected for all models.

The coefficients for the binary variables in the log transformed model do not depict the percent change in the dependent variable. Therefore, the coefficients were corrected to measure the percentage price change using, $g^* = \left[\exp^{(\hat{\beta} - \frac{1}{2}\mathrm{var}(\hat{\beta}))} - 1\right] * 100$,

where $\hat{\beta}$ is the OLS estimate, $\mathrm{var}(\hat{\beta})$ is the variance of $\hat{\beta}$ from OLS, and g^* is the correct estimate for the percent change in the dependent variable (Kennedy 2003). The interpretations for the following tables, 9-12, utilize this transformation. The transformed percents discussed are based on statistically significant coefficients.

Table 9. Log Regression Results for Model 1

	Large Red Tomatoes	Grape Tomatoes	Baby Carrots	Romaine Lettuce	Baby Spinach	Red Delicious	Golden Delicious
Intercept	196.2***	69.8***	70.9***	160.5***	190.7***	44.3***	59.0***
	29.9	20.3	33.8	26.8	14.8	8.6	8.0
PACKAGE	-50.4***	8.2		-55.0***	9.5	-20.2***	-20.7***
	16.9	13.9		12.7	7.7	2.7	2.6
LAYOUT	3.4	12.0**	9.7	13.8	-1.2	-1.3	1.3
	10.5	6.2	12.7	8.4	4.4	2.9	2.7
WALMART	-46.6	3.5	53.6***	-45.9***	-5.4	-14.9**	-17.9
	29.3	12.5	22.5	16.7	8.6	6.2	6.1
STOPSHOP	-1.8	0.8	15.4	1.9	10.9**	-18.8***	-19.2***
	15.5	7.3	15.1	10.5	6.0	3.7	3.4
OVERONE		28.1***	8.6	38.0***	13.0*	56.6***	44.3***
		9.1	17.8	13.2	6.9	6.8	5.8
AA	5.2	4.2	1.1	0.4	-3.5	2.1	3.0
	9.5	5.3	11.1	8.0	3.3	2.3	2.2
HISPANIC	17.0	-5.6	7.6	-2.7	-0.9	0.02	0.02
	11.2	5.6	12.8	8.9	3.8	2.6	2.4
ASIAN	-10.8	3.4	-1.7	4.4	-3.6	2.3	-0.6
	7.9	4.8	10.5	6.8	3.4	2.2	2.1
POVERTY	-37.5***	4.9	-14.2	10.7	2.8	-4.7	-5.4
	15.2	8.9	19.7	15.0	6.5	4.2	3.9
MKT2	4.6	5.3	-12.0	3.7	-0.05	-6.6*	-4.3
	17.9	10.2	20.3	13.3	6.2	3.8	3.5
MKT3	1.7	-0.2	-8.8	1.3	6.8	-7.0*	-6.1**
	12.0	7.0	13.8	10.1	4.7	3.5	3.2
MKT4	0.5	-7.2	5.1	4.4	-1.5	-2.8	-4.5
	17.0	11.6	23.6	16.9	7.9	5.3	4.9
N	27	46	42	46	49	46	47
F	3.55***	3.08**	1.270	5.83***	3.20***	18.49***	25.68***
R^2	0.709	0.423	0.310	0.672	0.509	0.867	0.898

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Table 9. Log Regression Results for Model 1 continued

	Gala	Potatoes	Bananas	Strawberries	Green Bell Peppers	Celery
Intercept	10.4	2.5	43.1	199.7***	135.1***	50.2**
	14.3	11.8	20.2	24.4	27.2	23.2
PACKAGE	-16.3***	-56.6	-34.1***	0.7	38.1**	12.9
	5.1	6.5***	12.5	17.6	18.8	12.7
LAYOUT	7.2	6.3*	5.1	-10.9	4.7	7.9
	5.6	3.7	7.6	6.5	11.9	6.5
WALMART	-34.7***	-65.8***	29.0	-49.9		-34.1***
	11.6	7.4	18.0	13.9		12.7
STOPSHOP	-19.0***	-13.6***	46.0***	55.9***	38.5***	-24.9***
	7.7	4.9	13.3	15.5	13.6	9.0
OVERONE	93.1***	37.7***	-57.2***	2.1		53.1***
	9.0	4.9	11.1	4.9		9.3
AA	2.3	6.1**	1.9	-5.1	-7.8	10.4**
	4.3	3.1	6.5	5.3	8.5	5.1
HISPANIC	1.8	-8.8***	3.9	-0.3	4.9	-6.7
	5.0	3.4	7.9	4.0	11.3	5.8
ASIAN	0.8	-2.4	-3.2	-0.3	-1.5	-0.9
	4.3	2.7	6.4	4.0	9.0	5.8
POVERTY	-7.3	6.5	-5.7	3.5	-4.7	3.4
	8.1	6.1	11.6	9.0	19.3	9.3
MKT2	-7.2	15.2***	8.6	-6.4	-2.2	12.2
	7.8	5.4	12.5	7.9	17.2	10.3
MKT3	-11.6*	8.1**	2.8	-1.3	7.6	6.0
	6.4	4.1	8.3	6.8	11.7	7.3
MKT4	-9.6	-5.4	-1.4	-3.0	7.2	4.2
	10.4	7.2	13.6	9.0	17.4	11.3
N	54	41	33	24	24	34
F	15.54***	34.36***	3.48***	3.39**	4.41***	5.37***
R^2	0.816	0.934	0.665	0.741	0.759	0.746

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Table 9 shows the results for Model 1. The coefficients of the *PACKAGE* variable all have the expected negative sign, except for strawberries, celery, grape tomatoes and baby spinach. None of the exceptional cases are statistically significant. *PACKAGE* was not included in the baby carrots model because all of the baby carrots sampled were prepackaged. This result implies that if organic produce items are prepackaged there are negative impacts on its retail price. The largest impacts are seen on the price of romaine lettuce, large red tomatoes, potatoes and green bell peppers.

There is a 55 percent decrease in the retail price of prepackaged romaine lettuce. Prepackaged large red tomatoes see a decrease of 50 percent in retail price. Both potatoes and green bell peppers experience a 43 percent decrease in retail price. This is expected as packaged products are suggested to decrease shipping and handling costs.

The store level variable depicting the type of space dedicated to organics, (*LAYOUT*), has coefficients with conflicting results across products. They were positive and significant for grape tomatoes and potatoes only. The estimated coefficients were conflicting in sign but insignificant across all other products. There were no expected signs for this variable. These results suggest a separate layout dedicated to organic produce may have a positive impact on some retail prices. There is a 12 percent increase in retail price for grape tomatoes sold at stores that designate separate sections to organic produce. Potatoes sold at stores with separate sections dedicated to organic produce experience a 6 percent increase in retail price.

The remaining estimated coefficients for store level variables had consistent results. The coefficients for *WALMART* are negative across all products, except for baby carrots, grape tomatoes and bananas. These coefficients were all statistically significant, except for large red tomatoes, grape tomatoes, bananas, baby spinach, golden delicious apples and strawberries. This suggests that the price of organic produce is lower at Wal-Mart Supercenters than at Specialty stores. There is a 48 percent lower retail price of potatoes and a 37 percent lower retail price of romaine lettuce sold at Wal-Mart Supercenters than those sold at Specialty stores. Gala apples, large red tomatoes and celery sold at Wal-Mart Supercenters have a 29 percent lower retail price than those sold at Specialty stores. Baby carrots are the only product to have higher prices (66 percent higher) sold at Wal-Mart Supercenters than at Specialty stores. This result could be due to the fact that baby carrots were double packaged only at Wal-Mart Supercenters; there were individual serving packages within one big package. *WALMART* was not included in the models for green bell peppers because these produce items were not available at any of the Wal-Mart Supercenters sampled.

The coefficients for *STOPSHOP* are negative and significant for some organic produce items and positive and significant for others. The retail price is lower at Super Stop and Shops than Specialty stores for celery (22 percent), red delicious (17 percent), golden delicious (17 percent), and gala apples (17 percent), and potatoes (12 percent). The coefficient is positive and significant for strawberries (57 percent), bananas (57 percent), green bell peppers (45 percent) and baby spinach (11 percent).

The stores with over one hundred employees (*OVERONE)* consistently have higher prices across almost all products; these price differences are typically statistically significant. This result implies that larger stores have higher prices for gala apples (150 percent), golden delicious apples (75 percent), celery (69 percent), red delicious apples (55), romaine lettuce (45 percent), potatoes (45 percent) and grape tomatoes (31 percent). The significant exception to this result is bananas. There is a 43 percent decrease in the retail price of bananas at larger stores. *OVERONE* was not included in the model for large red tomatoes and green bell peppers as all of those sampled were from stores with more than one hundred employees. There was no expected sign for this coefficient as previous research found conflicting results for the impact of store size. The coefficient could be positive as larger stores incur an increase in costs, specifically labor costs; however, the negative result could be due to a gain in efficiencies.

The coefficients for the community level variables were inconsistent and generally insignificant across all products. The percent of the population that is African

American (*AA*) is positive and significant for potatoes at the one percent level, meaning there is a six percent increase in the retail price of potatoes as the number of African Americans increases by one percent. The coefficient for the percent of the population that is Hispanic (*HISPANIC*) is positive and significant for large red tomatoes and negative and significant for potatoes. Therefore, as the number of Hispanics increases by one percent the retail price of large red tomatoes increases by 18 percent and the retail price of potatoes decreases by eight percent. The coefficient for the percent of population that is Asian (*ASIAN*) is negative and significant for baby spinach, meaning that as the number of Asians increases by one percent, the retail price of baby spinach decreases by 13 percent. The coefficient for *POVERTY* is negative and significant for large red tomatoes and golden delicious apples. Therefore, a one percent increase in the number of individuals below the poverty line results in a retail price decrease of 33 percent for large red tomatoes and 4 percent for golden delicious apples.

The market structure dummies are also inconsistent and generally insignificant across all products. The coefficients for *MKT2* are negative and significant for red delicious apples, while the *MKT3* coefficient is negative and significant for red delicious apples, golden delicious apples and gala apples. This means that the retail prices of red delicious, golden delicious and gala apples sold in stores within the market structure of conventional and non-traditional grocers (*MKT2)* or conventional and specialty grocers (*MKT3)* are lower than those within market structures of non-traditional, conventional and specialty grocers (*MKT1)*. This implies that a reduction in the amount of competition and a change in the type of competition results in a reduction in some organic produce retail price. The only exception is for potatoes. The coefficients for *MKT2* and *MKT3* are positive and significant for potatoes. Therefore, the retail prices of potatoes sold from stores within *MKT2* and *MKT3* are higher than those sold from stores in *MKT1*. The coefficients for *MKT4* are all inconsistent and insignificant.

Table 10. Log Regression Results for Model 2

	Large Red Tomatoes	Grape Tomatoes	Baby Carrots	Romaine Lettuce	Baby Spinach	Red Delicious Apples	Golden Delicious Apples
Intercept	198.4***	70.0***	0.714**	159.0***	189.6***	37.0***	53.2***
	24.9	19.5	0.322	24.3	13.7	8.3	7.3
PACKAGE	-40.8***	10.5		-42.8***	8.7	-17.4***	-18.3***
	14.9	13.0		12.3	7.4	2.7	2.5
LAYOUT	2.8	11.1**	0.070	14.3**	-0.4	-2.4	-0.1
	9.6	5.7	0.122	7.7	4.1	2.7	2.5
WALMART	-38.1*	4.7	0.651***	-36.5***	-9.3	-15.1***	-16.5***
	25.4	10.6	0.183	14.2	7.3	6.0	6.0
STOPSHOP	-3.2	-1.1	0.167	2.2	8.3	-17.1***	-17.4***
	12.8	6.7	0.139	9.7***	5.5	3.7	3.3
OVERONE		34.3***	0.043	45.3	15.7**	79.4***	59.7***
		8.8	0.171	12.8	6.6	6.9	5.7
AA	4.9	1.5	0.074	0.7	-6.3**	2.2	2.3
	8.7	5.1	0.105	6.8	3.4	2.2	2.0
HISPANIC	16.6	-3.5	0.025	-3.3	2.0	0.4	1.1
	9.9	5.3	0.117	7.8	3.8	2.6	2.4
ASIAN	-10.1	4.9	-0.131	4.7	-3.2*	0.9	-1.1
	9.1	5.9	0.128	8.5	4.2	2.8	2.6
POVERTY	-37.9***	1.3	-0.057	11.4	-1.0	-4.1	-6.4
	13.2	8.0	0.179	12.4	6.0	4.3	3.9
CONCENTRATE	0.4	2.8	-0.175	0.5	10.7	-0.7	0.8
	12.6	8.1	0.169	11.5	5.5	4.3	3.8
N	28	47	44	48	50	47	48
F	4.85***	2.53**	1.690	7.37***	4.17***	19.83***	28.92***
R^2	0.562	0.249	0.129	0.580	0.392	0.803	0.855

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Table 10. Log Regression Results for Model 2 continued

	Gala Apples	Potatoes	Bananas	Strawberries	Green Bell Peppers	Celery
Intercept	4.8***	17.9***	47.8***	197.0***	129.0***	56.4***
	13.8	12.0	19.0	21.8	22.8	20.9
PACKAGE	-14.0***	-42.9***	-28.8***	-2.0	-38.7**	10.2**
	5.0	7.2	12.0	16.4	17.3	12.1
LAYOUT	5.5	4.0	4.3	11.1***	4.9	7.5
	5.4	4.0	7.1	5.9	11.1	6.0
WALMART	-30.2***	-46.4***	38.7***			-27.0***
	10.8	7.6	15.4			10.1
STOPSHOP	-17.6***	-13.4***	56.2***	-41.3***	47.3***	-22.1***
	7.6	5.0	12.7	12.5	12.4	7.6
OVERONE	151.6***	49.4***	-43.4***	76.6***		74.0***
	9.1	5.4	10.7	14.4		8.8
AA	0.6	2.0	0.4	1.7	-8.4	7.0
	4.4	3.5	6.4	4.8	7.8	5.2
HISPANIC	4.6	-5.3	4.6	-4.5	3.8	-4.6
	5.0	3.8	7.8	4.9	10.0	5.9
ASIAN	0.5	-0.5	-2.5	0.9	3.9	3.4
	5.3	4.0	7.8	5.2	10.3	6.7
POVERTY	-10.7	-1.9	-7.6	3.7	-0.9	-0.7
	7.7	6.1	10.5	7.7	15.8	8.6
CONCENTRATE	4.3	3.0	0.2	0.9	4.3	7.8
	7.4	5.2	9.8	7.2	13.1	7.9
N	55	42	34	25	25	36
F	17.83***	31.52***	4.38***	4.45***	6.02***	6.66***
R^2	0.757	0.881	0.506	0.564	0.625	0.624

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

The only changes from Model 1 to Model 2 are the market level conditions considered. The coefficients for the product level, store level and community level variables remain consistent between Models 1 and 2. If a produce item is prepackaged there is a significant negative impact on price for all products, except for baby spinach, grape tomatoes, strawberries and celery. The only significant exception is celery, for which packaging results in a positive significant impact on price.

The effects of dedicating separate sections to organic produce by a store (*LAYOUT*) became significant for more products in Model 2 than Model 1. The coefficients are positive and significant for grape tomatoes, romaine lettuce, and strawberries. This implies that if a store designates separate sections to organic produce, there is likely to be higher retails prices for some organic produce.

The effects of the store type indicator variables (*STOPSHOP* and *WALMART*) remain generally negative and significant across all products, meaning organic produce sold at Wal-Mart Supercenters and Super Stop and Shops are priced lower than those sold at Specialty stores. The only exception of the generally negative relationship is for baby carrots and bananas. The model for organic baby carrots is not statistically significant. Organic bananas sold at Wal-Mart Supercenters and at Super Stop and Shops have statistically higher prices than those sold at Specialty stores.

Stores with over one hundred employees (*OVERONE)* have statistically higher prices across all products, except for bananas. Organic bananas are the only product with significantly lower prices in stores with more than one hundred employees.

The community level variables were again insignificant and inconsistent. The only exceptions were for baby spinach and large red tomatoes. Organic baby spinach was priced six percent less in areas with a one percent increase in African Americans and three percent less in areas with a one percent increase in Asians. A change in the percentage of Hispanics had no significant impact on the retail price of any of the products sampled. A one percent increase in the number of individuals below the poverty line (*POVERTY)* only significantly impacts the price of large red tomatoes. Organic large red tomatoes are priced 37 percent lower in areas with a one percent increase in the number of individuals below poverty.

Model 2 attempts to capture the impact of the amount of competition on the retail price of organic produce. When a store is in the presence of fewer than three competitors (*CONCENTRATE)* the impacts on retail price are positive for all products except baby carrots and red delicious apples, however, all the coefficients are insignificant. Thus in the analysis the number of competitors does not appear to have an impact on organic produce prices.

Model 3 is applied to Super Stop and Shops and Specialty stores separately to isolate the impacts of the presence of Wal-Mart Supercenters on price. Packaged produce items at Super Stop and Shops have significantly lower prices across all products, except for grape tomatoes and bananas. Both exceptions are insignificant. Packaging was not included in the models for large red tomatoes, baby carrots, baby spinach, potatoes, strawberries, and celery because all of these products sampled from Super Stop and Shop were prepackaged.

The Super Stop and Shops that dedicate separate sections to organic produce (*LAYOUT*) was only statistically important to the price of organic strawberries. This could be due to the fact that the format for organic produce was generally consistent across the Super Stop and Shops sampled.

The indicator variable depicting stores with over one hundred employees (*OVERONE)* was not included in any of the product models because all Super Stop and Shops included in the sample had more than one hundred employees.

The remaining effects were inconsistent and insignificant for all products. The community level variables are inconsistent and insignificant. In addition, the presence of a Wal-Mart Supercenter (*SUPERCENTER)* is inconsistent and insignificant across all products sold at Super Stop and Shops. Organic strawberries are the only exception. The price of organic strawberries sold at Super Stop and Shops are priced significantly lower when a Wal-Mart Supercenter is present in the market.

Table 11. Regression Results for Model 3 Applied to Super Stop and Shops

	Large Red Tomatoes	Grape Tomatoes	Baby Carrots	Romaine Lettuce	Baby Spinach	Red Delicious Apples
Intercept	1.680***	1.022***	0.914***	1.830***	2.170***	0.796***
	0.107	0.197	0.218	0.345	0.085	0.079
PACKAGE		0.117		-0.391***		-0.190***
		0.126		0.260		0.030
LAYOUT	-0.041	0.065	-0.072	0.176	-0.066	-0.051
	0.049	0.081	0.109	0.128	0.044	0.038
AA	-0.017	0.066	0.040	0.052	-0.016	0.026
	0.039	0.060	0.078	0.105	0.029	0.003
HISPANIC	0.061	-0.102	0.020	-0.060	-0.031	0.003
	0.047	0.069	0.087	0.116	0.033	0.031
ASIAN	-0.002	0.019	-0.063	0.049	0.047	0.001
	0.034	0.053	0.068	0.081	0.029	0.025
POVERTY	-0.147	0.026	-0.080	0.139	0.060	-0.041
	0.069	0.104	0.135	0.175	0.054	0.048
SUPERCENTER	-0.049	0.080	-0.072	0.105	0.011	-0.026
	0.055	0.096	0.106	0.151	0.043	0.043
N	16.000	23.000	19.000	23.000	26.000	32
F	1.670	0.990	0.490	0.920	0.890	8.08***
R^2	0.211	0.000	0.000	0.000	0.000	0.615

	Golden Delicious Apples	Gala Apples	Potatoes	Bananas	Strawberries	Celery
Intercept	0.815***	0.815***	-0.075*	-0.136	2.010***	1.302**
	0.073	0.073	0.111	0.103	0.163	0.280
PACKAGE	-0.177***	-0.173***		0.107		
	0.028	0.028		0.070		
LAYOUT	-0.019	-0.019	0.099	0.042	-0.122**	-0.045
	0.035	0.035	0.054	0.032	0.071	0.114
AA	0.027	0.027	0.022	0.018	0.029	0.119
	0.026	0.026	0.039	0.022	0.060	0.090
HISPANIC	0.008	0.008	-0.019	-0.027	-0.065	-0.136
	0.029	0.029	0.041	0.025	0.060	0.106
ASIAN	-0.010	-0.010	-0.020	0.055	0.007	-0.090
	0.023	0.023	0.033	0.025	0.048	0.109
POVERTY	-0.061	-0.061	-0.083	-0.015	0.058	-0.037
	0.045	0.045	0.070	0.039	0.102	0.141
SUPERCENTER	-0.004	-0.004	0.091	0.047	-0.013	-0.136
	0.039	0.039	0.055	0.032	0.079	0.162
N	32.000	32.000	18.000	18.000	18.000	14.000
F	7.92***	7.92***	1.960	1.830	0.590	1.160
R^2	0.609	0.609	0.250	0.251	0.000	0.066

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

It is important to note that the only significant models for Super Stop and Shops are those for red delicious, golden delicious and gala apples, all of which found only a significant negative impact of packaging. This is the only robust result for Model 3 applied to Super Stop and Shops.

Model 3 applied to Specialty stores results in more significant models overall. The models for romaine lettuce, baby spinach, red delicious apples, golden delicious apples, gala apples, potatoes and celery were all statistically significant. Within these models, packaging of the produce items resulted in lower prices, except for baby spinach, which is insignificant. Packaging was not included for celery as all the celery products sampled from Specialty stores were not packaged.

The only other significant effects across these products are for the variable *OVERONE*, indicating stores with over one hundred employees. The coefficients are positive and generally significant across all the statistically important models for Specialty stores.

The presence of a Wal-Mart Supercenter (*SUPERCENTER)* has a statistically significant and negative impact on prices for potatoes and baby spinach. Therefore, the presence of a Wal-Mart Supercenter results in a 18 percent decrease in the price of organic potatoes and a 20 percent decrease in the price of organic baby spinach sold by Specialty stores. This suggests that Wal-Mart Supercenters may result in lower prices on certain organic produce items but this effect was not observed to be widespread.

Table 12. Regression Results for Model 3 Applied to Specialty Stores

	Large Red Tomatoes	Grape Tomatoes	Baby Carrots	Romaine	Baby Spinach	Red Delicious Apples
Intercept	1.409	0.981***	0.674**	1.618***	1.897***	-0.131***
	0.681	0.335	0.312	0.541	0.299	0.309
PACKAGE				-0.447***	0.141	-0.153
				0.193	0.102	0.101
LAYOUT	0.363	-0.036	-0.236	0.201	0.114	0.207
	0.389	0.184	0.166	0.290	0.134	0.164
OVERONE		0.387***	0.194	0.371	0.075	0.694***
		0.123	0.106	0.201	0.091	0.115
AA	0.087	-0.122	-0.349**	0.041	0.112	0.179
	0.444	0.188	0.163	0.282	0.132	0.157
HISPANIC	0.258	0.198	0.418*	-0.072	-0.211	-0.391
	0.509	0.227	0.217	0.377	0.174	0.263
ASIAN	-0.260	0.041	-0.002	0.085	-0.128	0.266
	0.188	0.106	0.106	0.182	0.086	0.149
POVERTY	-0.272	-0.163	-0.158	0.101	0.172	0.290
	0.414	0.190	0.202	0.354	0.172	0.213
SUPERCENTER	-0.454	0.127	0.068	-0.161	-0.205**	-0.116
	0.456	0.178	0.165	0.309	0.134	0.141
N	11.000	19.000	19.000	19.000	18.000	11
F	2.160	2.090	0.490	3.46**	2.21*	11.15**
R^2	0.410	0.296	0.000	0.522	0.332	0.890

	Golden Delicious Apples	Gala Apples	Potatoes	Bananas	Green Bell Peppers	Celery
Intercept	0.815**	0.061***	-0.045***	0.249**	2.270	0.574**
	0.073	0.500	0.167	0.526	1.020	0.270
PACKAGE	-0.177	-0.052	-0.429***	-0.209		
	0.028	0.189	0.072	0.351		
LAYOUT	-0.019	0.085	0.174***	0.419	0.728	0.156
	0.035	0.287	0.084	0.280	0.490	0.157
OVERONE	0.406**	1.578***	0.394***	-0.493**	-0.618	0.565***
	0.161	0.205	0.059	0.182	0.493	0.118
AA	0.027	0.230	0.022	0.259		0.016
	0.026	0.259	0.082	0.245		0.146
HISPANIC	0.008	-0.208	-0.079	-0.329		0.024
	0.029	0.325	0.105	0.311		0.181
ASIAN	-0.010	-0.067	0.021	-0.003		0.022
	0.023	0.163	0.055	0.172		0.089
POVERTY	-0.061	-0.063	0.130	0.156	-0.382	0.052
	0.045	0.303	0.109	0.313	0.610	0.166
SUPERCENTER	-0.004	0.084	-0.183**	-0.275	-0.530	-0.070
	0.039	0.303	0.096	0.291	0.661	0.161
N	13.000	17.000	20.000	14.000	8.000	16.000
F	11.52***	6.88***	31.69***	2.000	0.790	8.95***
R^2	0.875	0.746	0.928	0.380	0.000	0.300

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Summary

The effects of the product, store, community and market level variables are generally consistent across the three types of models estimated. Prepackaged organic produce items are typically priced statistically lower than those not packaged. Organic produce sold at stores with more than one hundred employees consistently was sold at higher prices. Prices were typically lower at Super Stop and Shop stores and Wal-Mart Supercenters than Specialty stores. Community variables were inconsistent and insignificant across all three models for the majority of the organic produce items.

Models 1 and 3 showed some market structure impacts on the retail price of organic produce. Model 1 showed significant effects in both directions across the different market structures depending on the organic produce item. Model 3 reveals the presence of a Wal-Mart Supercenter lowers the price of organic strawberries at Super Stop and Shop stores and reduces the price of brown russet potatoes and baby spinach at Specialty stores. The effects of the number of competitors present in a market, (*CONCENTRATE*), estimated in Model 2 were insignificant across all products. Overall, market structure variables as specified here, did not have broad impacts on the observed organic produce prices.

CHAPTER 6

POOLED MODELS

To further examine possible common pricing strategies across products this chapter estimates price differences of groupings of similar organic products. Two types of groupings are used. The first is of similar products; for example golden delicious, red delicious and gala apples are pooled together to form a category apples. The second is pooling similar products on a broader level, such as fruits and vegetables. The hypothesis is products with similar characteristics are merchandised similarly. The price differences will be interpreted in terms of product, store, community and market level attributes. These pooled models will be estimated using Model 1, which captures the impact of the four varying market structures using *MKT2*, *MKT3*, and *MKT4*. .

The common product groups to be analyzed are listed in Table 13. The *F* test was used to test for the ability to pool these products. The null hypothesis of homoscedasticity of the residual variance was not rejected for the following pooled models. Similar tests for leafy greens (romaine lettuce and baby spinach) and tomatoes (large red tomatoes and grape tomatoes), as well as for vegetables (large red tomatoes, grape tomatoes, baby carrots, green bell peppers and celery) as a group showed that non-pooled (unrestricted) models were preferred to pooled (restricted) models.

Table 13. Common Product Groupings

Category	**Products Included**	**F value**
Apples	Red Delicious Apples, Golden Delicious Apples, and Gala Apples	1.54
Fruit	Red Delicious Apples, Golden Delicious Apples, Gala Apples, Bananas	1.65

Table 14 reports the OLS log-log regression results for Model 1 applied to organic apples as a pooled group. The model exhibits explanatory power of 81 percent at the .01 level of significance. The interpretations for the following tables utilize Kennedy's g^* transformation discussed in the previous chapter. The transformed percents discussed are based on statistically significant coefficients.

Table 14. Log-log Regression Results for Apples

Variables	**Coefficients**
Intercept	133.9***
	8.8
PACKAGE	-33.8***
	3.7
LAYOUT	2.3
	3.9
WALMART	-50.4***
	8.6
STOPSHOP	-42.2***
	5.3
OVERONE	120.7***
	7.4
AA	1.5**
	0.63
HISPANIC	0.17
	0.40
ASIAN	0.12
	0.11
POVERTY	-1.02
	0.82
MKT2	-12.0**
	5.5
MKT3	-10.9**
	4.8
MKT4	-11.0
	7.4
N	149
F	49.86***
R^2	0.814

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

The classic F test for restrictions implies that apples, no matter the type, are merchandised similarly. The important determinants for apples are packaging, store type from which they are sold, the number of employees, and the percentage of African Americans in a community.

The packaging of organic apples is negative and significant, meaning that packaged apples are priced significantly lower. Packaged apples are priced 28 percent lower than those that are not packaged.

All of the store level variables are significant, except *LAYOUT*, which depicts whether or not the retailer designates separate sections for organic produce. The store type variables are negative and significant at the .01 level. Organic apples are priced 39 percent lower at Wal-Mart Supercenters (*SUPERCENTER*) and 34 percent lower at Super Stop and Shops (*STOPSHOP*) than at Specialty stores. As expected, stores with over one hundred employees (*OVERONE*) price apples 150 percent higher.

All of the ethnicity variables are insignificant, except the variable depicting the percentage of African Americans in a community (*AA*). The percent of African Americans has a positive impact on the price of organic apples. *POVERTY* is also insignificant.

The market level impacts are consistently negative however, only two are significant. Organic apples are priced 11 percent lower in markets with conventional and non-traditional grocers present (*MKT2)* and 10 percent lower in markets with conventional and specialty grocers (*MKT3)* than in markets with non-traditional, conventional and specialty grocers (*MKT1)*. This suggests organic apples are priced lower in markets with fewer types of competitors present.

Table 15 reports the OLS log-log regression results for Model 1 applied to the fruit group including red delicious apples, golden delicious apples, gala apples and bananas. The explanatory power is 29 percent at the .01 level of significance.

Table 15. Log-log Regression Results for Fruit

Variables	Coefficients
Intercept	32.1***
	14.8
PACKAGE	-27.6***
	5.1
LAYOUT	-3.8
	5.4
WALMART	-4.3
	11.6
STOPSHOP	1.5
	7.2
OVERONE	41.7***
	9.4
AA	0.8
	4.2
HISPANIC	1.3
	4.1
ASIAN	2.7
	5.0
POVERTY	-4.5
	8.1
MKT2	-4.8
	7.6
MKT3	-7.4
	0.079
MKT4	-7.5
	9.9
N	101
F	5.98***
R^2	0.295

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

The packaging of organic fruit has a negative and significant effect on price. If the products in the fruit group are prepackaged there is an approximately 24 percent decrease in the retail price. The only other significant impact on the price of these fruit products is the number of employees at the store from which the grouping is sold. If a store has more than one hundred employees (*OVERONE*) these organic fruit products experience a 51 percent increase in price. This implies that larger stores have higher prices for organic produce. The remaining store level, community level and market level variables are consistently insignificant.

Summary

Product, store, community and market level variables are significant to the price of organic apples. Packaging negatively impacts the price of organic apples. Organic apples sold at Wal-Mart Supercenters and Super Stop and Shops are priced less than those at Specialty stores. Larger stores, stores with more than one hundred employees sell organic apples at a higher price. Organic apples are priced slightly higher in communities with a higher percentage of African Americans. Some market structure impacts on the retail price of organic apples are present. Markets 2 and 3 both show a negative impact on the price of organic apples. The price of organic apples is lower in markets with fewer types of competitors.

Only packaging and store size significantly impact the price of organic fruit. Packaging negatively impacts the price of organic fruit. As with apples, the stores with over one hundred employees charge higher prices for organic fruit than stores with fewer employees.

CHAPTER 7

CONCLUSION

The primary objective of this thesis was to examine the retail pricing and merchandising of organic produce across traditional and non-traditional store formats in New England. The secondary goal was to analyze the impacts of market structure and the effects of Wal-Mart Supercenters on the retail organic produce prices. This study also sheds some light on the pricing strategies of Super Stop and Shop, Specialty stores, and Wal-Mart Supercenters, and on the responses of these grocers to different competitive structures.

The findings of this thesis are consistent with those of other researchers: descriptive statistics show Wal-Mart Supercenters have overall lower prices than Super Stop and Shop and Specialty stores for organic produce. Wal-Mart Supercenter prices are statistically lower than those of Super Stop and Shop for all products except grape tomatoes and baby carrots. The products with the greatest significant average price difference between Wal-Mart Supercenters and Super Stop and Shop stores are large red tomatoes ($1.20) and baby spinach ($1.25). The products with the greatest average price difference between Wal-Mart Supercenters and Specialty stores are celery ($0.55) and red and golden delicious apples ($0.50). Several other products, such as bananas and potatoes, exhibit more than a $0.40 average price difference between the two store formats. There are no consistent price differences between Super Stop and Shop and Specialty stores.

Wal-Mart Supercenters and Super Stop and Shop stores demonstrate low variability in their pricing of organic produce across stores. In contrast, Specialty stores exhibit high variability.

The differences in average retail prices across different store formats are explained by product, store, community and market level attributes in the econometric analyses. The most significant impacts on the retail prices of organic produce were packaging, store type, and store size. Regardless of store, community and market attributes, packaged products result in lower prices. Typically a product sold at Super Stop and Shop or a Wal-Mart Supercenter had lower prices than those sold at Specialty stores. Finally stores with more than one hundred employees predominately had higher prices.

The number of competitors in a market is not significant in explaining the pricing of organic produce, while the type of competitors is significant for certain organic produce items. The retail price of baby spinach, red delicious apples, golden delicious apples, and gala apples sold in stores within a market structure of conventional and non-traditional grocers or conventional and specialty stores are lower than those within market structures of non-traditional, conventional and specialty grocers. However, the price of potatoes is higher in stores within a market structure of conventional and non-traditional grocers or conventional and specialty stores than in those within a market structure containing all three types of grocers. This suggests a change in the type of competitors present in a market results in a change in the pricing of certain organic produce items. The number of competitors and not the type was also examined and was found to have insignificant relationships to retail prices for any of the organic produce items sampled.

The presence of a Wal-Mart Supercenter resulted in no significant effect on the price of organic produce items at Super Stop and Shop stores. However, the presence of a Wal-Mart Supercenter was associated with an 18 percent decrease in the price of organic potatoes and a 20 percent decrease in the price of organic baby spinach sold at Specialty stores at the one percent level of significance.

Previous theoretical and empirical research suggests that the entry of Wal-Mart results in lower average prices in areas in which they operate. In a statistical analysis, Global Insight 2005 concluded the expansion of Wal-Mart from the period of 1985 to 2004 is associated with a 9% decline in food-at-home prices, a 4% decline in commodity prices and a 3% decline in overall consumer prices as measured by the Consumer Price Index. Bianco and Zellner (2003) found that Wal-Mart Supercenters, as with conventional Wal-Mart stores, price their products significantly lower than their competitors. Volpe (2007) found that Wal-Mart Supercenters offer groceries at significantly lower prices than those of conventional supermarkets in New England.

These results can be important for organic consumers. Most national studies suggest higher income consumers are more likely to purchase more organic products (Thompson 1998). Wal-Mart's entry may mean that consumers in lower income brackets have more opportunity to purchase organic products as they become more affordable. Moreover, consumers of all income brackets have price incentives to choose to buy organics at Wal-Mart Supercenters.

Some critics argue that lower prices at Wal-Mart may not be a consumer benefit. The US Bureau of Labor Statistics reports that reductions in service levels may reduce the positive benefit of lower prices. Therefore, consumers are thought to pay less for less service. Alternatively, benefits may be enhanced by pressure on other retailers to reduce prices. Therefore, consumers benefit from direct and indirect price effects due to Wal-Mart Supercenter entry.

The results also show that Wal-Mart Supercenters have low relative price variability, except for baby carrots, romaine lettuce, and bananas. This implies that overall Wal-Mart prices its goods relatively consistently across store locations. Super Stop and Shop prices also show low relative variability, except for romaine lettuce. Therefore, consumers can expect to pay similar prices at Wal-Mart Supercenters and Super Stop and Shop stores regardless of the competitive structure of the local market. In contrast, Specialty store prices exhibit high relative variability. This may be explained in part by the grouping of Whole Foods, Wild Oats, and Trader Joe's stores in this category.

The effects of market structure and competition on organic produce prices are generally inconsistent. Holding constant other determinants of organic food prices, the type of market structure in which an organic produce item is sold significantly affects the pricing of baby spinach, red delicious apples, golden delicious apples, gala apples and potatoes. This means that the retail prices of these products sold in stores within a market structure of conventional and non-traditional grocers or conventional and specialty grocers are lower than those within market structures of non-traditional, conventional, and specialty grocers. In contrast, the retail price of potatoes sold from stores within market structures of conventional and non-traditional grocers or conventional and specialty grocers are higher than those within market structures containing all three store types. Therefore, depending on the product, a change in the competitive structure will result in either negative or positive changes in prices experienced by consumers.

The number of competitors in a market has no significant relationship to the retail price of the organic products sampled. This result combined with the finding directly above leads to the conclusion that the type of competitor rather than simply the number of competitors drives the price of certain organic produce items. The competitive effect of the presence of Wal-Mart Supercenters does not have significant impacts on Super Stop and Shop's pricing of organic produce. However, it does significantly affect the pricing for a small number of products at Specialty stores.

Overall, this thesis contributes to the discussion of the mainstream movement of organic produce. It emphasizes the importance of further quantitative analysis on the national level. First, it would allow for general conclusions to be drawn about pricing strategies across traditional and non-traditional grocers. Second, it would allow more variation in the data. For example, the variability in community demographics and store attributes would be better captured through the analysis of many regions.

As organic sales have moved into mainstream retail markets, conventional food industry corporations are becoming more involved with the organic movement. The corporate shift of organic produce at the retail level is likely to affect growers, suppliers, and handlers of organic produce. The integrity of organic quality may be questioned with the transformation of the organic landscape. Movement to the mainstream market is important in securing the growth of the organic market sector in the long run as long as product integrity in terms of compliance to organic standards is maintained. These impacts must be analyzed quantitatively to contribute to the understanding of the mainstreaming of organics.

APPENDIX: LINEAR REGRESSION RESULTS

Table A1. Linear Regression Results for Model 1

	Large Red Tomatoes	Grape Tomatoes	Baby Carrots	Romaine Lettuce	Baby Spinach	Red Delicious Apples	Golden Delicious Apples
Intercept	4.817***	1.928***	1.722	6.449***	7.001***	1.578***	1.830***
	0.649	0.661	0.991	1.576	1.112	0.153	0.154
PACKAGE	-1.613***	0.255		-3.639***	1.176	-.394***	-.408***
	0.467	0.531		0.879	0.725	0.057	0.059
LAYOUT	0.069	.429*	0.428	1.041**	-0.063	-0.015	-.408***
	0.282	0.245	0.481	0.565	0.416	0.061	0.059
WALMART	-1.401**	-0.028	2.072***	-2.283**	-0.54	-.321***	-.360***
	0.757	0.509	0.912	1.236	0.814	0.13	0.144
STOPSHOP	-0.107	-0.067	0.401	-0.026	0.823	-.395***	-.402***
	0.418	0.296	0.585	0.779	0.558	0.079	0.08
OVERONE		.886**	0.067	1.894***	1.192*	.958***	.749***
		0.366	0.687	0.94	0.647	0.145	0.137
AA	0.073	-0.002	0.009	0.043	-0.053	0.016	.019*
	0.042	0.041	0.079	0.122	0.065	0.01	0.01
HISPANIC	.067**	0.005	0.035	-0.003	-0.044	-0.001	0.0006
	0.03	0.028	0.06	0.093	0.047	0.007	0.007
ASIAN	-0.086	0.04	0.009	0.051	-.254**	0.015	-0.002
	0.067	0.065	0.14	0.162	0.118	0.017	0.018
POVERTY	-.136**	-0.005	-0.04	0.028	0.041	-0.007	-0.011
	0.049	0.047	0.103	0.164	0.082	0.012	0.012
MKT2	-0.079	0.265	-0.362	0.362	-0.147	-.148*	-0.109
	0.448	0.408	0.805	0.955	0.607	0.082	0.083
MKT3	0.203	0.042	-0.208	0.168	0.704	-.153*	-0.128
	0.329	0.276	0.549	0.761	0.456	0.076	0.077
MKT4	0.083	0.001	0.202	0.397	-0.493	-0.096	-0.111
	0.434	0.443	0.875	1.179	0.754	0.113	0.115
N	28	47	43	47	50	47	48
F	5.21***	1.37	1.36	4.39***	3.01***	15.88***	18.37***
R^2	.631	.088	.087	.469	.329	.795	.816

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Table A1. Linear Regression Results for Model 1 continued

	Gala Apples	Potatoes	Bananas	Strawberries	Green Bell Peppers	Celery
Intercept	1.125***	1.335***	1.527***	7.254***	4.296***	1.312*
	0.155	0.117	0.163	1.439	0.931	0.76
PACKAGE	-.323***	-.778***	-.423***	0.229	1.402	0.231
	0.07	0.078	0.137	1.215	0.784	0.62
LAYOUT	0.096	.106**	0.055	-.731*	0.249	0.397
	0.076	0.043	0.083	0.453	0.506	0.251
WALMART	-.644***	-.440***	-.461**			
	0.161	0.091	0.187			
STOPSHOP	-.427***	-0.084	-.517***	-4.756***	2.576***	-0.29
	0.107	0.061	0.146	0.953	0.591	0.259
OVERONE	1.402***	.266***	.647***	5.174***		1.312***
	0.125	0.06	0.121	1.052		0.347
AA	1.66	0.008	0.008	-0.012	-0.048	0.067
	1.202	0.008	0.013	0.067	0.073	0.04
HISPANIC	0.06	-0.005	0.007	-0.04	0.033	-0.014
	0.947	0.006	0.01	0.052	0.064	0.028
ASIAN	0.714	-0.009	-0.023	0.003	-0.066	0.024
	2.139	0.012	0.024	0.1	0.125	0.088
POVERTY	-0.718	0.006	-0.013	0.049	-0.054	-0.015
	1.593	0.011	0.016	0.088	0.111	0.045
MKT2	-.134*	.140**	0.08	-0.401	-0.081	0.024
	0.11	0.068	0.136	0.561	0.752	0.348
MKT3	-.163*	0.085	0.054	-0.106	0.316	0.436
	0.093	0.054	0.094	0.479	0.53	0.268
MKT4	-0.18	-0.068	0.027	-0.277	0.287	0.144
	0.144	0.093	0.146	0.639	0.751	0.411
N	55	42	34	25	25	35
F	19.30***	23.75***	4.05***	5.86***	6.78***	4.30***
R^2	.802	.869	.525	.690	.706	.538

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Table A2. Linear Regression Results for Model 2

	Large Red Tomatoes	Grape Tomatoes	Baby Carrots	Romaine Lettuce	Baby Spinach	Red Delicious Apples	Golden Delicious Apples
Intercept	5.045***	1.854***	1.61376	6.728***	6.964***	1.471***	1.718***
	0.552	0.659	1.00231	1.451	1.098	0.166	0.153
PACKAGE	-1.708***	0.324		-3.632***	0.991	-.373***	-.396***
	0.406	0.494		0.852	0.725	0.057	0.059
LAYOUT	0.053	.396*	0.452	1.085**	-.093	-.036	0.011
	0.259	0.221	0.464	0.538	0.403	0.059	0.059
WALMART	-1.604**	0.075	2***	-2.046**	-1.115	-.339***	-.364***
	0.643	0.413	0.734	1.003	0.705	0.127	0.139
STOPSHOP	-.227	-.091	0.45	0.106	0.476	-.386***	-.398***
	0.073	0.266	0.528	0.682	0.539	0.08	0.079
OVERONE		.954***	-0.018	1.854**	1.400**	.988***	.800***
		0.353	0.667	0.909	0.655	0.15	0.135
AA	.073*	-.012	0.029	0.055	-.082	.018*	.019**
	0.036	0.037	0.072	0.089	0.062	0.009	0.009
HISPANIC	.062**	0.009	0.021	-0.019	-.014	0.001	0.003
	0.028	0.025	0.054	0.073	0.045	0.007	0.006
ASIAN	-.081	0.059	-0.032	0.009	.070	0.0004	-.010
	0.075	0.069	0.156	0.179	0.132	0.021	0.021
POVERTY	-.127***	-.019	-0.005	0.045	-.003	-.007	-.014
	0.044	0.041	0.091	0.125	0.077	0.011	0.011
CONCENTRATE	-.122	0.163	-0.195	-0.235	0.533	-.036	-.006
	0.332	0.291	0.598	0.71	0.479	0.089	0.088
N	28	47	43	47	50	47	48
F	6.90***	1.72	1.72	5.55***	3.26***	17.06***	20.93***
R^2	0.66	0.135	0.13	0.497	0.315	0.777	0.809

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Table A2. Linear Regression Results for Model 2 continued

	Gala	Potatoes	Bananas	Strawberries	Green Bell Peppers	Celery
Intercept	1.117***	1.420***	1.580***	7.199***	4.201***	1.288**
	0.163	0.11	0.161	1.28	0.81	0.632
PACKAGE	-.303***	-.754***	-.416***	-.078	1.260*	0.359
	0.069	0.079	0.131	1.152	0.721	0.396
LAYOUT	0.074	.079*	0.053	-.848*	0.286	0.208
	0.074	0.042	0.077	0.432	0.473	0.209
WALMART	-.649***	-.427***	.496***			1.714***
	0.148	0.081	0.158			0.306
STOPSHOP	-.415***	-.107**	.513***	-4.903***	2.608***	-1.123***
	0.105	0.055	0.139	0.852	0.539	0.349
OVERONE	1.363***	.302***	-.638***	5.307***		-.811***
	0.129	0.059	0.116	0.975		0.252
AA	.019*	-.002	0.006	-.022	-.051	0.012
	0.011	0.007	0.011	0.06	0.06	0.035
HISPANIC	0.004	0.003	0.007	-.031	0.029	0.017
	0.008	0.005	0.009	0.044	0.053	0.025
ASIAN	-.013	0.0004	-.023	0.054	0.006	0.09
	0.024	0.013	0.026	0.118	0.13	0.086
POVERTY	-.011	-.012	-.013	0.042	-.043	-.034
	0.014	0.009	0.014	0.071	0.087	0.036
CONCENTRATE	-.051	0.071	-.015	0.217	0.214	0.363
	0.096	0.049	0.099	0.485	0.52	0.245
N	55	42	34	25	25	35
F	21.93***	26.81***	5.15***	7.95***	9.36***	5.56***
R^2	0.794	0.862	0.557	0.722	0.735	0.573

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Table A3. Regression Results for Model 3 Applied to Super Stop and Shops

	Large Red Tomatoes	Grape Tomatoes	Baby Carrots	Romaine Lettuce	Baby Spinach	Red Delicious Apples
Intercept	4.772***	2.827***	2.214***	7.037***	9.244***	2.107***
	0.331	0.558	0.406	1.982	0.612	0.135
PACKAGE		0.37		-2.997*		-.396***
		0.478		1.637		0.068
LAYOUT	-0.186	0.388	-0.197	1.098	-0.78	-0.074
	0.221	0.309	0.27	0.762	0.452	0.083
AA	0.001	0.002	0.024	0.117	-0.025	0.021
	0.034	0.053	0.041	0.132	0.067	0.013
HISPANIC	0.04	-0.015	-0.008	-0.078	-0.062	0.003
	0.024	0.036	0.028	0.103	0.042	0.009
ASIAN	-0.011	0.006	-0.022	0.071	0.115	-0.001
	0.059	0.074	0.068	0.186	0.11	0.021
POVERTY	-0.082	-0.003	0.005	0.129	0.081	-0.012
	0.037	0.053	0.045	0.165	0.069	0.014
SUPERCENTER	-0.314	0.189	-0.168	0.74	0.253	-0.044
	0.243	0.375	0.281	0.887	0.445	0.092
N	15	23	19	23	26	32
F	1.78	.61	.37	.91	.84	6.24***
Adjusted R^2	.238	.001	.002	.002	.003	.541
	Golden Delicious Apples	Gala Apples	Potatoes	Bananas	Strawberries	Celery
Intercept	2.099***	2.099***	.861***	.867***	7.69***	3.575***
	0.13	0.13	0.092	0.115	0.784	0.757
PACKAGE	-.372***	-.372***		0.075		
	0.065	0.065		0.086		
LAYOUT	-0.02	-0.02	.099**	0.042	-0.856	-0.014
	0.08	0.08	0.052	0.032	0.5	0.386
AA	.023*	.023*	-0.005	0.005	-0.033	0.043
	0.013	0.013	0.01	0.004	0.097	0.073
HISPANIC	0.004	0.004	0.004	-0.0007	-0.042	-0.016
	0.009	0.009	0.006	0.003	0.055	0.073
ASIAN	-0.006	-0.006	0.001	0.012	0.032	-0.188
	0.02	0.02	0.013	0.011	0.13	0.219
POVERTY	-0.015	-0.015	-0.013	-0.004	0.063	-0.034
	0.014	0.014	0.01	0.005	0.089	0.064
SUPERCENTER	-0.002	-0.002	0.067	0.041	-0.125	-0.316
	0.089	0.089	0.056	0.032	0.545	0.462
N	32	32	18	18	18	14
F	5.99***	5.99***	1.31	1.18	.51	.34
R^2	.529	.529	.099	.068	.002	.004

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

Table A4. Regression Results for Model 3 Applied to Specialty Stores

	Large Red Tomatoes	Grape Tomatoes	Baby Carrots	Romaine Lettuce	Baby Spinach	Red Delicious Apples
Intercept	4.476	2.395**	1.675***	6.245*	7.873***	0.667
	2.332	1.12	0.416	3.266	2.176	0.287
PACKAGE				-3.859**	1.503	-.435*
				1.42	0.962	0.134
LAYOUT	-2.784	-0.168	-0.218	1.48	1.468	0.618
	4.735	0.827	0.3	2.308	1.32	0.262
OVERONE	4.209	1.140*	0.341	1.573	0.469	.751**
	4.509	0.544	0.192	1.575	0.87	0.189
AA	0.037	-0.061	-0.029	0.016	-0.026	0.065
	0.18	0.116	0.042	0.304	0.184	0.033
HISPANIC	0.237	0.102	0.047	0.038	-0.227	-0.097
	0.225	0.102	0.04	0.296	0.178	0.036
ASIAN	-0.085	0.043	0.007	0.165	-0.398	.175*
	0.147	0.142	0.059	0.427	0.262	0.059
POVERTY	-0.493	-0.077	-0.023	0.035	0.208	0.073
	0.536	0.101	0.045	0.338	0.216	0.03
SUPERCENTER	3.476	0.602	0.291	-0.712	-3.11**	-0.2
	6	0.746	0.288	2.38	1.27	0.167
N	11	19	18	19	18	11
F	3.21	1.35	.78	2.68*	2.41	22.52**
Adjusted R^2	.607	.118	.009	.427	.398	.945
	Golden Delicious Apples	Gala Apples	Potatoes	Bananas	Green Bell Peppers	Celery
Intercept	1.782**	.941*	1.332***	1.723**	7.025*	0.813
	0.488	0.466	0.186	0.59	2.792	1.052
PACKAGE	-.614*	-0.225	-.770***	-0.224		0.562
	0.272	0.221	0.1	0.529		0.484
LAYOUT	0.19	0.232	.247*	0.286	2.766	0.62
	0.386	0.36	0.124	0.452	2.085	0.708
OVERONE	0.504	1.382***	.196**	-.694*	-3.202	1.269**
	0.413	0.254	0.088	0.292	2.089	0.527
AA	0.013	0.037	0.002	-0.006		0.024
	0.056	0.043	0.017	0.057		0.088
HISPANIC	-0.01	-0.03	-0.009	-0.008		0.028
	0.052	0.041	0.015	0.055		0.075
ASIAN	0.024	0.003	0.0003	-0.027		0.054
	0.083	0.062	0.024	0.081		0.108
POVERTY	0.01	0.006	0.02	-0.005	-0.339	0.043
	0.049	0.049	0.02	0.061	0.497	0.087
SUPERCENTER	-0.089	-0.034	-0.248	-0.425	-2.14	-0.232
	0.31	0.37	0.139	0.433	2.807	0.649
N	13	17	20	14	8	16
F	7.74**	11.59***	19.13***	1.00	.65	5.03**
R^2	.817	.841	.884	.001	.002	.682

***: Difference is significant at the .01 level **: Significant at the .05 level
*: Significant at the .10 level

REFERENCES

(2005). “The Pros and Cons of Organic Agriculture: Going Organic”. *Progress*. October/November Issue (127).

(2006). “WalMart to Double Organic Food Offerings”. *Health and Nutrition*. March 7, 2006.

Bianco, A. and W. Zellner (October 6, 2003). Is Wal-Mart Too Powerful? http://www.businessweek.com/magazine/content/03_04/b3852001_mz001.htm. *Business Week Online*.

Binkley, J. K. and J. M. Connor (1996). Market Competition and Metropolitan-Area Grocery Prices. Storrs, Connecticut, University of Connecticut**:** 1-39.

Bresnahan, T. F. and P. C. Reiss (1991). "Entry and Competition in Concentrated Markets." The Journal of Political Economy **99**5: 977-1009.

Business & Company Resource Center (2005). United States-Organic Industry. *Datamonitor Industry Market Research*. http://galenet.galegroup.com/servlet/BCRC?vrsn/

Calvin, Linda and Roberta Cook (coordinators), Mark Denbaly, Carolyn Dimitri, Lewrene Glaser, Charles Handy, Mark Jekanowski, Phil Kaufman, Barry Krissoff, Gary Thompson and Suzanne Thornsbury (2001). *U.S. Fresh Fruit and Vegetable Marketing: Emerging Trade Practices, Trends, and Issues,* USDA, ERS, AER-795.

Chen, Z. (2003). “Dominant Retailers and the Counterveiling-Power Hypothesis.” RAND Journal of Economics **34**(4): 612-625.

Cotterill, R. W. and W. P. Putsis (2000a). "Market Share and Price Setting Behavior for Private Labels and National Brands." Review of Industrial Organization **17**(1): 17-39.

Cotterill, R. W. and C. D. Harper (1995). Market Power and the Demsetz Critique: An Evaluation of Food Retailing. Research Report No. 29, Food Marketing Policy Center, University of Connecticut.

Cotterill, R. W. and L. E. Haller (1992). "Barrier and Queue Effects: A Study of Leading U.S. Supermarket Chain Entry Patterns." The Journal of Industrial Economics **40**(4): 427-40.

Cotterill, R. W. (1986). "Market Power in the Retail Food Industry: Evidence from Vermont." *The Review of Economics and Statistics* **68**(3): 379-86.

Dimitri, C. and C. Greene (2003). "Recent Growth Patterns in the US Organic Foods Market." US Department of Agriculture Economic Research Service, Market and Trade. Division of Economics and Resource Economics. Bulletin Number 777. www.ers.usda.gov/AmberWaves/Feb03/Findings/OrganicAgriculture.htm

Dimitri, C. and N. Richman (2000). "Organic Foods: Niche Marketers Venture into the Mainstream." Electronic Economic Outlook Report, US Department of Agriculture.

Estes, E.A. and V.K. Smith (1996). "Price, Quality, and Pesticide Related Health Risk Considerations in Fruit and Vegetable Purchases: An Hedonic Analysis of Tucson, Arizona Supermarkets." Journal of Food Distribution **27**(3): 59-76.

Geithman, F.E. and B.W. Marion (1993). "Testing for Market Power in Supermarket Prices: A Review of the Kaufman-Handy/ERS Study," in Cotterill, R.W. ed., *Competitive Strategy Analysis in the Food System*, Boulder: Westview Press, 253-292.

Global Insight (2005). *The Economic Impact of Wal-Mart.* Prepared by Business Planning Solutions, Global Insight Advisory Services Division.

Hartman Group (1999). "The Organic Consumer Profile." Electronic Report from the Hartman Group and Organic Trade Association.

Hausman, J., E. Leibtag (2004). "CPI Bias from Supercenters: Does the BLS Know that Wal-Mart Exists?" MIT and Economic Research Service, U.S. Department of Agriculture.

Hoch, S. J., B.-D. Kim, A.L. Montgomery, P.E. Rossi (1995). "Determinants of Store-Level Price Elasticity." Journal of Marketing Research **32**(1): 17-29.

Kaufman, P.R. and C.R. Handy (1989). *Supermarket Prices and Price Differences: City, Firm and Store-level Determinants*. ERS, USDA, TB-1776.

Khanna, N. and S. Tice (2000). "Strategic Responses of Incumbents to New Entry: The Effect of Ownership Structure, Capital Structure, and Focus." *The Review of Financial Studies* **13**(3): 749-79.

Klonsky, K., L. Tourte, G. D. Thompson, and B. Krissoff (1998). "The Emergence of US Organic Agriculture" Department of Agricultural Economics, University of Georgia.

Kortbech-Olesen, R. (2002). "The United States Market for Organic Food and Beverages." United Nations Conference on Trade and Development with the World Trade Organization, International Trade Centre.

Lamm, R. M. (1981). "Prices and Concentration in the Food Retailing Industry." The Journal of Industrial Economics **30**(1): 67-78.

Leibtag, E. S. (2005). “Where You Shop Matters: Store Formats Drive Variation in Retail Food Prices.” US Department of Agriculture. The Economic Research Service.

Lindsay, H. (2006). “Corporate Organic & Supermarket Chains Undermining Organic Integrity: Does Corporate Organic Change Organic Landscape?” Organic Consumer Association. http://www.organicconsumers.org/organic/integrity013106.cfm.

Lohr, Luanne (1998). “Implications of Organic Certification for Market Structure and Trade.” Department of Agriculture and Applied Economics, University of Georgia.

MacDonald, J.M. and P.E. Nelson (1991). “Do the Poor Still Pay More? Food Price Variations in Large Metropolitan Areas.” Journal of Urban Economics **30**: 344-359.

Makatouni A. (2002). “What Motivates Consumers to Buy Organic Food in the UK?: Results from a Qualitative Study.” British Food Journal **104**(3-5): 345-352.

Marion, B. W., K. Heimforth, F. Bailey (1993). Strategic Groups, Competition, and Retail Food Prices. Competitve Strategy Analysis in the Food System. R. W. Cotterill, Westview Press**:** 179-99.

Marion, B.W. (1998). “Competition in Grocery Retailing: The Impact of a New Strategic Group on BLS Price Increases.” Review of Industrial Organization **13**(4) 381-399.

Mark, J (2004). “Organic Inc.” *San Francisco Chronicle*. Retrieved from http://www.sfgate.com/cgiin/article.cgi?file=/chronicle/archive/2004/.

McTaggart, J (2006) “Mass appeal: With Wal-Mart gung ho on organics, suppliers and retailers alike will need to rethink their strategies” *Progressive Grocer*.

Newmark, C. M. (1990). "A New Test of the Price-Concentration Relationship in Grocery Retailing." Economics Letters **33**(4): 369-73.

Oberholtzer, L., C. Dimitri and C. Greene (2005). “Price Premiums Hold on as US Organic Produce Market Expands.” US Department of Agriculture. Electronic Outlook Report from Economic Research Services.

Palma, M., R. Emerson, D. House (2003). Evaluating Factors Influencing Grocery Store Choice. Montreal, Canada, Paper presented at the annual AEAA meeting.

Park, T. and L. Lohr (1996). “Supply and Demand Factors for Organic Produce.” American Journal of Agricultural Economics **78**(3): 647-655.

Perloff, J. and D. Carlton (2005). Modern Industrial Organization. Pearson Addison Wesley Publishing. Boston, Massachusetts. (4): 12, 73-75.

Purcell, D. (2006). “Supermarkets Go Specialty.” Retrieved from SpecialtyFood.com June 2, 2006.

Resnick, C. (2003) “What We Need to Know About the Corporate Takeover of the "Organic" Food Market.” *Idaho Observer*.
Retrieved from http://www.proliberty.com/observer/20060518.htm.

Scheuer, K. (2006) “Wal-Mart’s Organic Bomb.” *Grist Environmental Magazine*. Retrieved from http://gristmill.grist.org/story/2006/5/12/63314/8910. July 7, 2006.

Sharkey, T. and K. Stiegart (2006) “Impacts of Nontraditional Food Retailing Supercenters on Food Price Changes.” Food System Research Group, Monograph Series (20).

Shy, O. (1995). Industrial Organization: Theory and Applications. The MIT Press. Cambridge, Massachusetts. 1-6, 169-189.

Simmons, F.E. (1949). “Packaging Aids to Marketing.” Journal of Marketing **13**(4): 512-517.

Spevack, Y. (2006). “Why is Oganic Food More Expensive and When Will it Change?” Retrieved from *Organic ‘Food Co UK Magazine* June 19, 2006.

Thompson, G. D. and L. K. Glaser (2001). “National Demand for Organic and Conventional Baby Food.” Paper presented at the Western Agricultural Economics Association, Logan Utah.

Thompson, G. D. and L. K. Glaser (2000). “Demand for Organic and Conventional Beverage Milk.” Paper presented at the Western Agricultural Economics Association, Vancouver, Brittish Columbia.
http://agecon.lib.umn.edu/cgi-bin/pdf_view.pl?paperid=2259&ftype=.pdf

Thompson, G. D. and L. K. Glaser (1998). “Demand for Organic and Conventional Frozen Vegetables.” Paper presented at the American Agricultural Economics Association, Nashville, Tennessee.
http://agecon.lib.umn.edu/cgi-bin/pdf_view.pl?paperid=1353&ftype=.pdf

Thompson, G.D. and Julia Kidwell (1998). “Explaining the Choice of Organic Produce: Cosmetic Defects, Prices, and Consumer Preferences.” American Journal of Agricultural Economics **80**(2): 277-287.

Thompson, G.D. (1998). “Consumer Demand for Organic Foods.” Department of Agricultural & Resource Economics, University of Arizona.

US Department of Agriculture, National Organic Program (2006). NOP Standards and Guidelines. Retrieved from http://www.ams.usda.gov/nop/indexIE.htm. May 17, 2006.

Volpe, R. J. III and N. Lavoie (2007). “The Impact of Wal-Mart Supercenters on Grocery Prices on New England.” Review of Agricultural Economics, in press.

Warner, M. (2005). "Wal-Mart Beginning to Dominate Retail Grocery Sales in the US". *The New York Times*. October 6, 2005
http://www.nytimes.com/2005/10/06/business/06grocery.html

Whole Foods Market Survey (2004). "Organic Trend Tracker." Annual survey issued by Whole Foods Market®.

Williams, J.R., J.R. Black, and J.F. Steffe (1982). "An Economic Analysis of Retort Packaging of Fruit and Vegetable Commodities." North Central Journal of Agricultural Economics **4**(2): 81-90.

Yu, C.-C. and J. M. Connor (2002). "The Price-Concentration Relationship in Retailing: Retesting Newmark." *Agribusiness* **18**(4): 413-26.