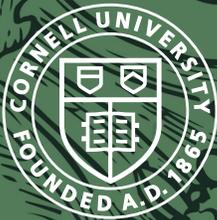


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CASE STUDIES OF SUPERMARKETS AND  
FOOD SUPPLY CHAINS IN LOW-INCOME  
AREAS OF THE NORTHEAST:

# KENT COUNTY STORE 2, DELAWARE

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Case Studies of Supermarkets and Food Supply Chains in Low-Income Areas of the Northeast: Kent County Store 2, Delaware. By Kristen S. Park<sup>1,4</sup>, Miguel Gómez<sup>2</sup>, Kate Clancy<sup>3</sup>, Extension Bulletin 2017-10. Charles H. Dyson School and Applied Economics and Management, College of Agriculture and Life Sciences, Cornell University, Ithaca, NY 14853.

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# Kent County Store 2, Delaware

## Introduction

As part of a collection of EFSNE projects that examined distribution systems, 11 store case studies were conducted to gain a better understanding of stores serving low-income areas and their role in the regional food system of the Northeast. The cases are an effort to record important characteristics of the participating stores and their supply chain partners. This case describes a supermarket and with it the supply chains of two of the eight foods in the EFSNE project's market basket, which served as a focal point for many of its research activities.

Case study interviews were conducted between 2013 and 2014. Fictitious names are used to maintain confidentiality of the case study participants.

## Place: Kent County, DE

Kent County is the southernmost county in Delaware, located on the Delmarva Peninsula. It is relatively sparsely populated with a population of 167,477 persons (Table 1). The economy is largely driven by agriculture and the Delaware Beaches in Kent County are a strong tourist attraction, with miles of ocean beaches.

The median household income is \$53,375, somewhat lower than the state median of \$60,231. Persons below poverty level for the same time period is 12.8 percent, just greater than the state average which is 12.0 percent. The community in which the case study store is located is a small village with a population of 4,152.

The Economic Census reports 25 grocery stores, excluding convenience stores, in Kent County which is approximately 1.5 grocery stores per 10,000 residents (Table 1). In addition to grocery stores, the county has three supercenters and wholesale clubs and 58 convenience stores. These plus the grocery stores total approximately 5.1 grocery, convenience, supercenter, and club stores per 10,000 residents.

Supermarkets and other grocery stores sell a variety of foods, such as canned and frozen foods; fresh fruits and vegetables; and fresh and prepared meats, fish, and poultry. Supermarkets are traditionally defined in the food retail industry as large grocery stores having \$2 million or more in annual sales. Convenience stores or food marts (except those with fuel pumps) primarily engage in retailing a limited line of goods that generally includes milk, bread, soda, and snacks.

**TABLE 1: Demographic and Food Environment Statistics for Kent Store 2**

	Community zip code	Kent county	Delaware
<b>DEMOGRAPHICS</b>			
<i>Population and Age</i>			
Population <sup>1</sup>	4,152	167,477	917,060
Median age <sup>1</sup>	41.9	36.8	39.1
Less than 5 years of age <sup>a,1</sup>	5.3%	6.6%	6.1%
Average household size <sup>1</sup>	2.64	2.74	2.63
<i>Education</i>			
High school degree or higher <sup>a,1</sup>	80.8%	86.0%	88.0%
Bachelor's degree or higher <sup>a,1</sup>	14.5%	22.7%	29.4%
<i>Race and Ethnicity</i>			
African American or Black <sup>a,b,1</sup>	15.6%	27.0%	23.2%
Hispanic <sup>a,c,1</sup>	5.2%	6.4%	8.6%
<i>Poverty and Program Participation</i>			
Poverty rate <sup>a,1</sup>	17.1%	12.9%	12.0%
Food insecurity rate <sup>a,2</sup>	13.1%	12.6%	21.4%
Share of SNAP recipients <sup>a,d,1,3</sup>	N/A <sup>e</sup>	21.4%	16.6%
<i>Income</i>			
Median household income <sup>1</sup>	\$53,859	\$55,169	\$60,231
<b>FOOD ENVIRONMENT</b>			
Grocery stores <sup>f,4</sup>	0.00	1.49	1.81
Convenience stores <sup>f,4</sup>	7.23	3.46	1.23
Warehouse clubs and supercenters <sup>f,4</sup>	0	0.18	0.13

**Notes:**

<sup>a</sup> Percentage of entire population.

<sup>b</sup> Alone or in combination with other races.

<sup>c</sup> Of any race.

<sup>d</sup> Calculated by dividing the number of SNAP recipients by the population.

<sup>e</sup> Data not available at the zip code level.

<sup>f</sup> Number per 10,000 people.

*Sources:*

<sup>1</sup> American Community Survey 5-Year Estimate, 2010 - 2014, copied from [http://factfinder.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml](http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml) on April 27, 2016.

<sup>2</sup> Food insecurity, 2013, FeedingAmerica.org, downloaded from <http://www.feedingamerica.org/hunger-in-america/our-research/map-the-meal-gap/data-by-county-in-each-state.html> on April 27, 2016.

<sup>3</sup> Small Area Income and Poverty Estimate, July 2013, downloaded from <http://www.census.gov/did/www/saipe/data/model/tables.html> on April 27, 2016.

<sup>4</sup> County Business Patterns Database, 2013, downloaded from [https://www.census.gov/econ/cbp/download/13\\_data/](https://www.census.gov/econ/cbp/download/13_data/) on April 29, 2016. Currently online at <https://www.census.gov/data/datasets/2013/econ/cbp/2013-cbp.html>.



The owner has one other store, and both stores sell closeout products due to label changes, over productions, warehouse damage, or products that are almost expired.



## Kent County Store 2

Kent County Store 2 is an independently owned discount supermarket that has been in business for three years.<sup>1</sup> The owner has one other store, and both stores sell closeout products due to label changes, over productions, warehouse damage, or products that are almost expired.

The store is about 20,000 square feet with adequate frozen and refrigerated storage. It has 52 full and part-time employees. It buys products from about 15-20 suppliers. The store has its own trucks and transports from the primary warehouse facilities to the store.

The most important departments in order of sales are: grocery, frozen foods, deli, bulk, dairy, and produce. This distribution is different from the average supermarket where perishables such as meat and produce are more prominent and frozen foods and deli less so (Table 2). It reflects further the opportunities available in procuring “closeout” foods.

**TABLE 2: Average Distribution of U.S. Supermarket Sales, Various Departments**

Department	Percent of store sales
Groceries, food and non-food	30.9
Meat, fresh	13.8
Produce	11.3
Dairy	9.0
Deli	5.0
Frozen foods	6.4
All other	23.7

Source: Progressive Grocer, 67th Annual Consumer Expenditures Study, July 2014.

The store’s overall operating gross margin, the difference between the purchased price and selling price divided by the selling price, is 30 percent, higher than the industry average. Gross margin is an important measure of the margin available to pay for all operations above and beyond the cost of the product. The 2015 median gross margin for supermarkets reported by the Food Marketing Institute is 28 percent.<sup>2</sup>

<sup>1</sup> The store manager was interviewed in 2013. Although this case study is written in present-tense, it is meant to provide a snapshot in time, and the authors make no claims that the data reflect anything other than the store’s situation at that time.

<sup>2</sup> *The Food Retailing Industry Speaks 2016*. The Food Marketing Institute. Arlington, VA 22202.

The manager reported that sales in the last three years have been growing. Sales this year may be fluctuating, but it is hard to assess since recipients of the Supplemental Nutrition Assistance Program (SNAP) now receive their payments at different scheduled times of the month. SNAP sales are very high, between 50-60 percent of all store sales. Sales may also be affected by a new supermarket that recently opened nearby.

When asked "What external factors impact your ability to be in business in the community?" the store manager had a positive comment about the store and its environment, "It is a low-income area, and people like deals."

The store manager only listed one external factor that significantly impacts her store's business and that is safety and security. Her ability to procure regionally produced foods and healthy foods is not significantly limited by anything; however, she noted that the availability of healthy products from various suppliers depends on the department. For instance in grocery, healthy versions of foods are limited to what is available from packaged goods manufacturers; however in their bulk department they can get organic products and healthier versions of items.

The store manager anticipates growing sales in the next three years, especially as there are so many low-income families in the community. The store has such low prices on foods, even the local food pantry sometimes buys from the store. She expects the store to be in business in 10 years.

#### **Market basket items – Milk and Frozen Broccoli**

Kent Store 2 carries one brand of milk, which is Dairy Hill. Dairy Hill is the milk processor that also delivers and manages the dairy case for the store.

The fluid milk sales by percent fat are:

- Whole                      32 percent of fluid milk sales
- 2%                            43 percent
- 1%                            12 percent
- Skim                         13 percent

The frozen broccoli florets sold in the store are unbranded and in unlabeled packaging and are sold in 32-ounce clear plastic bags. They do not sell any other frozen broccoli product. The frozen broccoli is packaged and purchased from Frozen Paks and is a foodservice or institutional product.

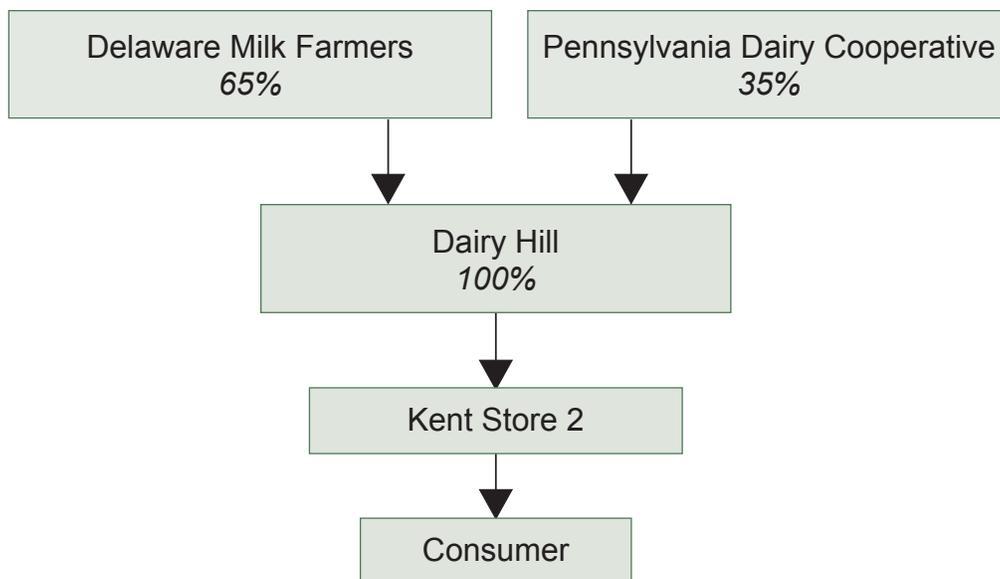
## Supply Chains

We trace the supply chains of two products from our market basket sold by Kent Store 2, milk and frozen broccoli, to determine the sources of these foods and the extent of regional food system participation. We define a regional supply chain as one where the product is produced, or grown, in the Northeast region.

### Product 1: Fluid Milk

Figure 1 depicts the general supply chain for Kent Store 2's fluid milk. Starting at the store and tracing back the supply chain, the boxes upstream indicate the percent of the downstream member's total purchases. For example, Dairy Hill provides 100 percent of the store's fluid milk.

**FIGURE 1:** Fluid Milk Supply Chain for Kent Store 2



**Note:** Shaded boxes represent supply chain members located in the Northeast Region. Numbers in boxes represent the percent of the next member's supply.

*Source:* Author's calculations based on case interviews.

“  
The processor  
purchases about  
65 percent of its  
raw milk directly  
from 15 local  
farmers all located  
within 15 miles from  
the plant.

”

### *Dairy Hill*

Dairy Hill is a milk processor located in Wilmington, Delaware. It delivers and manages the store’s milk case via automatic replenishment and provides 100 percent of the fluid milk. It has supplied milk to the store as long as the store has been open.

Dairy Hill sells approximately \$26 million of fluid milk per year throughout Delaware, Maryland, New Jersey, and Pennsylvania. Its milk is labeled rbST-free.

The processor purchases about 65 percent of its raw milk directly from 15 local farmers all located within 15 miles from the plant. It purchases the remaining 35 percent from a large milk marketing cooperative in Pennsylvania. The volume purchased from the cooperative varies seasonally as it increases during the school year when Dairy Hill is supplying milk to schools. The Pennsylvania marketing cooperative has between 700-800 members from farms located in Pennsylvania and south along the East Coast.

Dairy Hill delivers, stocks and manages its products on the shelf and invoices the store twice per week. Delivery, stocking and shelf management is included in the price. Payment is expected in seven days. Dairy Hill sometimes collaborates on marketing. If there are any rejects in large quantities, they are returned to Dairy Hill.

### **Regional Comparisons**

Kent Store 2 has two fluid milk supply chains, one defined by the Delaware farms that serve Dairy Hill directly and one defined by farms that are part of a Pennsylvania-based dairy cooperative. Both of these are regional supply chains. Table 3 shows the price margin<sup>3</sup> per gallon of milk received by each member of the supply chain. “Dairy farmer” is a representative of the dairy farms that sell under each supply chain.

Table 3 shows the percent of total, or proportion, of the retail price received by each member, using the member’s price margin. For example, the Delaware dairy farmer member’s price margin for a gallon of milk is \$1.76. The price margin for the processor is \$1.34. We note that the margin is calculated by the selling price minus the purchase price; it is what is left to pay for all other business expenses and profits. It is not an indication of profitability.

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<sup>3</sup> Price margin is defined here as the sale price minus the purchase price.

**TABLE 3: Allocation of Retail Price in Kent Store 2's Fluid Milk Supply Chain**

Supply chain segment	Dairy Hill's Delaware farms		Pennsylvania Dairy Co-op	
	Price margin (\$/gallon)	% of retail price	Price margin (\$/gallon)	% of retail price
Dairy farmer <sup>1</sup>	1.76	53.5	1.86	56.5
Transportation	0.02	0.5	0.04	1.1
Processor	1.37	41.7	1.26	38.2
Retail <sup>2</sup>	0.14	4.3	0.14	4.3
Total retail price	3.29	100.0	3.29	100.0

<sup>1</sup> USDA, NASS, QuickStats. 2013 price of milk per hundred weight for Delaware and Pennsylvania farmers converted to price per gallon, using conversion of 8.6 pounds per one gallon of milk.

<sup>2</sup> Milk delivery and dairy case management included in the cost.

Source: Author's calculations based on case interviews

Table 4 shows the distance and fuel used to get milk from a Delaware farm and a Pennsylvania dairy cooperative farm to Kent Store 2. The added hauling distance from the Pennsylvania farm did not change the fuel use per hundredweight very much.

**TABLE 4: Food Miles and Fuel Use in Kent Store 2's Fluid Milk Supply Chain**

Supply chain segment	Food miles	Truck miles <sup>1</sup>	Truck capacity	Fuel use <sup>2</sup>	Fuel use per cwt shipped
	<i>number</i>		<i>cwt</i>	<i>gallons</i>	
<b>Delaware farm serving Dairy Hill to Kent Store 2</b>					
Dairy farm to Dairy Hill	15	30	619 <sup>1</sup>	5	0.01
Dairy Hill to Kent Store 2	73	146	40	13	0.33
All segments	88	176		18	0.34
<b>Pennsylvania farm member of Pennsylvania Dairy Co-operative to Kent Store 2</b>					
Dairy farm to Dairy Hill	50	100	619 <sup>1</sup>	17	0.03
Dairy Hill to Kent Store 2	73	146	40	13	0.33
All segments	123	246		30	0.36

<sup>1</sup> Tank capacity is 7,200 gallons; one gallon of milk weighs 8.6 pounds.

<sup>2</sup> Tractor-tankers used to transport fluid milk from farm to processor have a capacity of 7,200 gallons and obtain 6 mpg. Box trucks (16 ft) used to transport dairy products from the milk processor to Kent Store 2 have a capacity of 4,000 pounds and obtain 11 mpg.

Source: Author's calculations based on case interviews and USDA, Agricultural Marketing Service.

### Prospects for Regional System Expansion

The Northeast generally produces sufficient milk for its beverage milk consumption, even though it does not produce enough to supply its need for many additional dairy products, including cheeses, yogurts, butter, etc.<sup>4</sup>

<sup>4</sup> Novakovic, Andrew. Personal communication, December 12, 2016. E-mail.

We define a regional supply chain as one where the product is produced, or grown, in the region. Therefore, we can say that both supply chains for Kent Store 2 are regional supply chains. These regional supply chains provide 100 percent of the value-added activity (Table 5).

Table 5 presents estimates of the value-added activities by each member of the various supply chains. Members that are located in the Northeast are shaded gray. We weight the member's retail price share (see Table 3) by the proportion of the store's total milk that they provide (see Figure 1) to calculate the extent of total regional participation in the supply chain. Table 5 summarizes the extent of members' participation in the supply chains as well as the total extent of regional value-added activity in the milk supply chains.

**TABLE 5:** Extent of Regional Value-Added Activity in Kent Store 2's Fluid Milk Supply Chain

	Percent of retailer's fluid milk supplies	Value-added <sup>1</sup>	Value-added retained by supply chain member	Extent of regional value-added activity <sup>2</sup>
Supply chain segment	%	% of retail price	%	%
<b>Regional: Delaware farm to Kent Store 2<sup>3</sup></b>				
Dairy farms	65	53.5	34.8	
Transportation		0.5	0.3	
Dairy Hill	100	41.7	27.1	
Kent Store 2 <sup>3</sup>	100	4.3	2.8	
All segments	65	100.0	65.0	65%
<b>Regional: Pennsylvania farm to Kent Store 2<sup>3</sup></b>				
Dairy farm from Pennsylvania Dairy Co-op	35	56.5	19.8	
Transportation		1.1	0.4	
Dairy Hill	100	38.2	13.4	
Kent Store 23	100	4.3	1.5	
All segments	35	100.0	35.0	35%
<b>Added-value contained in region</b>				<b>100%</b>

<sup>1</sup> This column contains the % of retail price from table 3 above. Dairy farms value-added includes transportation from farm to processor.

<sup>2</sup> This column captures all regional activity in the Northeast within the supply chain.

<sup>3</sup> By default, the retailer percent is 100 percent.

**Note:** Shaded rows indicate supply chain members located in the Northeast.

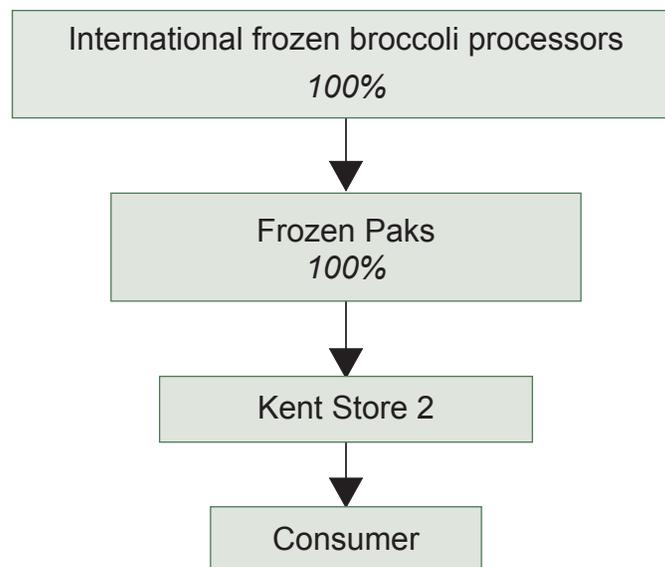
*Source:* Author's calculations based on case interviews.

## Product 2: Frozen Broccoli

Broccoli production in the Northeast is quite small and is all for fresh consumption; commercial-scale frozen broccoli production in the Northeast does not exist. While production and initial processing of frozen broccoli is handled almost exclusively overseas, companies that repackage frozen loads of broccoli for retail and institutional sales exist in the region.

Figure 2 depicts the supply chain of frozen broccoli for Kent Store 2. The supply chain is narrow with only one supplier providing frozen broccoli. Starting at the store and tracing back the supply chain, the boxes upstream indicate the percent of the downstream member's total purchases. Frozen Paks provides 100 percent of Kent Store 2's frozen broccoli and purchases all of its frozen broccoli from international suppliers.

**FIGURE 2:** Frozen Broccoli Supply Chain for Kent Store 2



**Note:** Shaded boxes represent supply chain members located in the Northeast Region. Numbers in boxes represent the percent of the next member's supply.

*Source:* Author's calculations based on case interviews.

### Supplier

Frozen Paks has supplied frozen broccoli to Kent Store 2 for the last three years, as long as the store has been open. It is an importer and repacker of frozen foods, and supplies the store year round. The store purchases almost 100 percent of their frozen broccoli from Frozen Paks, although occasionally they get a closeout deal from other companies such as Green Giant.

Frozen Paks processes frozen fruits and vegetables and supplies them to foodservice and industrial customers. It imports frozen broccoli from Guatemala. It transports them on frozen trucks owned primarily by the company, although it does sometimes use common charter. The company has three plants with the closest located in Maryland.

Orders are placed by e-mail on a Monday every month to Frozen Paks, delivered that Thursday to a frozen storage facility from where frozen product is delivered to the store as needed. The average order volume is 12-20 cases per week, and there are 12 bags per case. Delivery is not included in the price. The store is charged a delivery fee for the storage and transportation of goods.

Payment is expected in seven days. There are no marketing collaborations. Rejects are handled by reducing the price and selling at lower cost, as most of the rejects are simply due to having more stem than floret in the package.

The store is very satisfied with Frozen Paks as a supplier, although it would like more product diversity available.

### Regional Comparisons

In this section, we examine the frozen broccoli supply chain for Kent Store 2. Frozen Paks is the only frozen broccoli processor represented in Kent Store 2's supply chain and most of the frozen broccoli is grown and individually quick frozen (IQF) in Guatemala.

Table 6 shows the price margin<sup>5</sup> per two-pound bag of frozen broccoli received by each member of various supply chains. In addition, it shows the percent, or proportion, of total retail price received by each member, using the member's price margin. For example, Frozen Pak's price margin for a two-pound bag of frozen broccoli is \$0.08. The price margin for Kent Store 2 is \$0.85. We note that the margin is what is left to pay all other business expenses and profits. It is not an indication of profitability, as some industries and business have higher cost structures than others.

The price margin for Frozen Paks is extremely small. An explanation may be that this product is almost at its sell-by date or otherwise needs to be moved quickly by the repacker. As

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<sup>5</sup> Price margin is defined here as the sale price minus the purchase price.

described above, Kent Store 2 is a discount grocer that buys heavily discounted product. In addition, Kent Store 2 has its own trucks and transports from the buying cooperative's frozen storage. Therefore, transportation is paid for by Kent Store 2 and is included in its price margin as opposed to Frozen Paks' price margin.

**TABLE 6: Allocation of Retail Price in Kent Store 2's Frozen Broccoli Supply Chain**

	<b>International</b>	
	<b>Frozen broccoli</b>	
<b>Supply chain segment</b>	Price margin (\$/2lb)	% of retail price
International processor-Guatemala	1.02	44.5
Transportation	0.34	14.9
Frozen Paks	0.08	3.5
Kent Store 2	0.85 <sup>1</sup>	37.1
Total retail price	2.29	100.0

<sup>1</sup> Includes transportation, extra storage, and handling from Frozen Paks.

Source: Author's calculations based on case interviews

Table 7 shows the distance and fuel used to get frozen broccoli from the producer-processor to the retailer. Despite a three-thousand mile journey and fuel use of almost 300,000 gallons, frozen broccoli transportation from Guatemala to New York City was estimated as almost one-tenth of a gallon per hundredweight, less than the fuel use per hundredweight from the frozen foods repacker to Kent Store 2. This is because of the large capacity and fuel efficiency of the ocean vessel used in the estimates as opposed to that of the small box truck used to transport the frozen broccoli to the store.

**TABLE 7: Food Miles and Fuel Use in Kent Store 2's Frozen Broccoli Supply Chain**

	<b>Food miles</b>	<b>Truck miles<sup>1</sup></b>	<b>Truck capacity</b>	<b>Transportation fuel use<sup>2</sup></b>	<b>Fuel use per cwt shipped</b>
Supply chain segment	<i>number</i>		<i>cwt</i>	<i>gallons</i>	
International processor-Guatemala to Frozen Paks	2,900	2,900	400	290,000	0.09
Frozen Paks to Kent Store 2	39	78	40	7.1	0.18
All segments	2,939	2,978		290,007	0.27

<sup>1</sup> Truck miles are equal to food miles when frozen broccoli travels over 150 miles.

<sup>2</sup> Ocean vessels used to transport frozen broccoli from Guatemala to New York can have a capacity of 40,000 pounds per TEU transportation unit and 8,000 TEUs on board. Vessels obtain 0.01 miles per gallon (assuming 8,000 TEU capacity) (<https://people.hofstra.edu/geotrans/index.html>)

Trailer trucks used for shipping frozen broccoli across land transport have a capacity of 40,000 pounds and obtain 6 miles per gallon.

<sup>3</sup> For fuel use per cwt shipped, retail weight for the container ship (8,000 TEU) is being used

Source: Author's calculations based on case interviews and USDA, Agricultural Marketing Service.

### Prospects for Regional System Expansion

In this case, the regional value-added activity of repacking frozen broccoli is minimal. The packaging is a 2-pound, generic, unbranded clear poly bag. The product, packaged in the U.S. by Frozen Paks, is primarily intended for the foodservice sector, but is purchased and sold by Kent Store 2 as a bulk, low-cost solution for its customers.

We define a regional supply chain as one where the product is produced, or grown, in the region. Therefore, we can say that a regional supply chain for frozen broccoli does not exist for Kent Store 2 (Table 6), whose frozen broccoli originates in Guatemala or Mexico. We use the Guatemala source to represent the international supply chain (see Figure 2).

Some value-added activity— packaging, wholesaling and retailing—is conducted in the region. We weight the member retail price shares (see Table 6) by the proportion of the supply that they provide (see Figure 2) to calculate the extent of total regional participation in the supply chain, which is summarized in Table 8.

The supply chain stream starts with frozen broccoli from Guatemala. This stream includes activities from growers' production, from the frozen processor, from the frozen repacker, Frozen Paks, and from Kent Store 2 retailer.

The sum of the regional activities is 40.6 percent, which means 40.6 percent of the value-added activities from Kent Store 2's frozen broccoli supply chain is being conducted in the region.

Prospects for expansion of regional production on a scale to enter grocery retailing are limited.

**TABLE 8:** Extent of Regional Value-Added Activity in the Kent Store 2 Frozen Broccoli Supply Chain

	Percent of retailer's frozen broccoli supplies	Value-added <sup>1</sup>	Value-added retained by supply chain member	Extent of regional value-added activity <sup>2</sup>
Supply chain segment	%	% of retail price	%	%
International Producer-Processor	100	44.5	44.5	
Transportation		14.9	14.9	
Frozen Paks	100	3.5	3.5	
Fresh Foods retailer	100 <sup>3</sup>	37.1	37.1	
All segments	100	100.0		40.6%
<b>Added-value performed in region</b>				<b>40.6%</b>

1 This column contains the % margins of retail revenue from table 5 above.

2 This column captures all regional activity in the Northeast within each supply chain (excludes supply chain activity outside of the Northeast).

3 As default, the retailer percent is 100%.

**Note:** Shaded rows indicate supply chain members located in the Northeast.

*Source:* Author's calculations based on case interviews.



The close affiliation between the cooperative buying network and the store help to overcome some of the buying disadvantages small, independent supermarkets often have.



## Key Lessons for Kent Store 2

Kent Store 2 is a small, independent supermarket located in Delaware. It purchases most of its supplies from a cooperative buying group but also purchases from other suppliers.

The product supply chains described in this case are fluid milk and frozen broccoli.

### The Store and Its Environment

#### Effect of size and economies of scale

- The store, approximately 20,000 square feet, is smaller than the average supermarket and solely owned. It sells most of the products that larger supermarkets do, including groceries, produce, dairy, and deli products and offers them at discount prices due to the fact that many are “closeout” items, those close to their expiration date or are overstocks. The discounted closeout products that the store offers help to position the store as a niche retailer.
- The store's primary supplier is its cooperative buying network. The close affiliation between the cooperative buying network and the store help to overcome some of the buying disadvantages small, independent supermarkets often have.

### **Presence of relationships**

- The manager reports that the store has a positive and open relationship with the broader community. The store is readily accessible to a large number of people. It provides food for community events at times, such as food for a local sponsored bonfire at one of the State Parks and an annual Bike Ride. It also hosts an annual customer appreciation day.
- The store has a bulk department that sells many foods that are considered “natural” or organic and has a new, large gluten-free section. The manager reported that these were a result of demand from the customers as well as being able to find suppliers.

### **Market Basket Supply Chains**

#### **Effect of ownership structure on the supply chains**

- As an independent store, Kent Store 2 can choose its own suppliers and business partners and sculpt its selection or assortment of products to meet its customers’ demands. Although the store offers products that are closeouts and overstocks, the owner also uses additional departments, such as the deli and bulk foods, to offer additional, supplemental products that are in demand but that also fit the store’s low price image. Direct ownership has allowed the store to supply its customers with products they are interested in and not just products available from the cooperative distribution center.
- Effect of regional production/industry**
- The Northeast region produces significant amounts of milk and other dairy products. All the value-added activities are also conducted in the region. This industry maintains production, processing, and distribution activities. In this case, as is often the case with dairy, the milk distribution is handled by the processor.
  - Manufacturing/processing plants are located close to areas of commercial production of broccoli and milk. In addition, the cost of labor has drawn frozen broccoli production overseas to a number of countries in Latin America where production and manufacturing labor are both relatively inexpensive.

#### **Extent of regional value-added activity**

- The regional value-added activity for milk sold by Kent Store 2 is 100 percent. The regional nature of fluid milk is highly governed by the difficulty and cost in shipping perishable fluids.

- Frozen broccoli is grown and processed outside the region. Despite this, many value-added supply chain activities—importing, re-packing for retail and food service, storage, and shipments—are conducted in the region. The value-added activities conducted regionally are estimated as 40.6 percent.
- We see that even for supply chains in which the origin is very far away there is a lot of value-addition going on in the Northeast due to the distribution and retailing system in the region. This is important because it translates into economic activity.

**Effect of geography/distance**

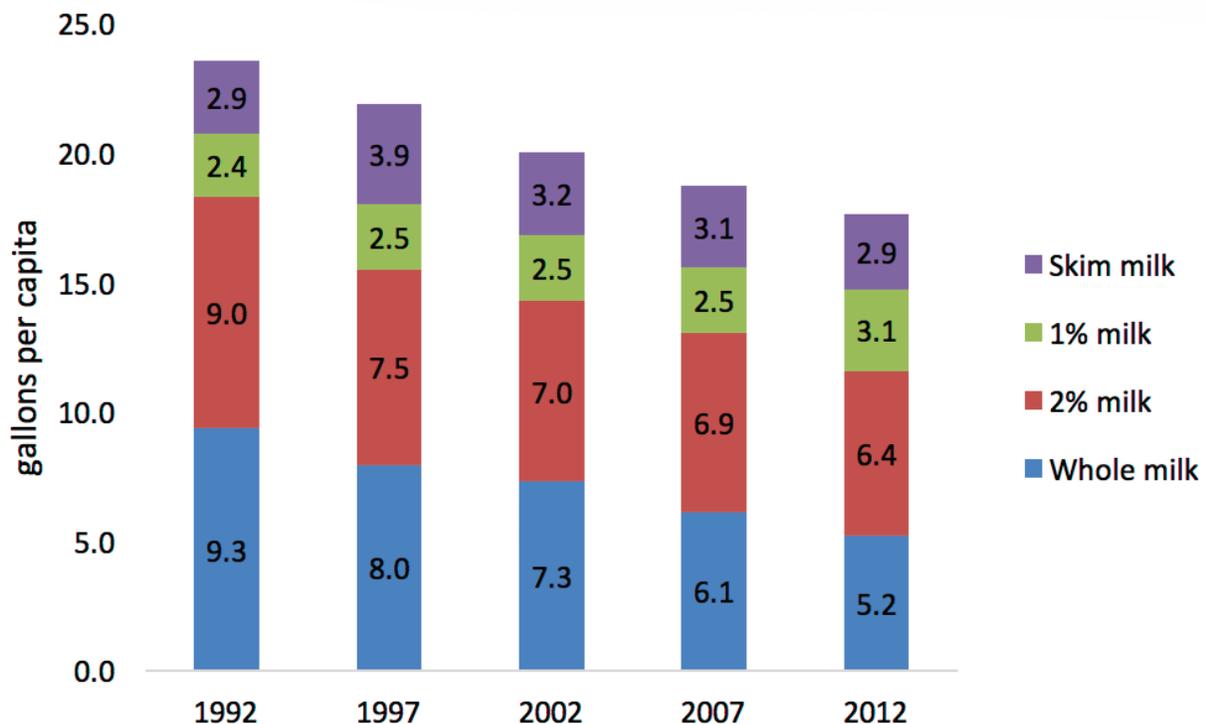
- The fuel use for the two products, milk and frozen broccoli, are 0.34-0.36 and 0.27 gallons per hundredweight respectively.

## Appendix

### Milk Industry Profile

The dairy industry produces milk, one of the most common foods consumed by the U.S. populace and a food that has one of the highest household penetration rates. But per capita consumption of milk has been declining since its peak in 1945. Seen in Figure A.1., whole and 2% milk consumption have been declining while skim milk consumption has been stable. Per capita consumption of 1% milk, unlike all the other forms of milk, has been increasing slightly.

**FIGURE A.1:** U.S. Milk Consumption per Capita, whole and reduced fat milk



USDA, ERS, Food Availability Data System. <http://www.ers.usda.gov/data-products/food-availability-%28per-capita%29-data-system/.aspx#26675> accessed 7-30-2015.

Milk is a very important retail product category. Mintel reports that 91 percent of all consumers over 18 bought milk within the past six months.<sup>6</sup> While milk consumption per capita is declining, milk sales alone still account for about 26.5 percent of dairy case sales in supermarkets and about 2.4 percent of total supermarket sales (Table A.1.).

<sup>6</sup> Mintel, 2014. Milk, Creamers and Non-Dairy Milk - US - April 2014.

**TABLE A.1: Percent of Supermarket Dairy Department Sales by Category, 2014**

	<b>Percent of dairy department</b>
Supermarket Dairy Department	
<i>(9.0% of supermarket sales)</i>	
Milk	26.5
Cheese	25.8
Yogurt	11.5
Juices, Drinks-Refrigerated	9.3
All other <sup>1</sup>	26.8

<sup>1</sup> includes eggs, butter and margarine, cottage cheese, sour cream, toppings, dough products, snacks, spreads, dips, pudding, and desserts.  
 Source: Progressive Grocer, "67th Annual Consumer Expenditures Study". July 2015.

### **Production**

Required daily milking, specialized, refrigerated transportation tankers for raw milk, and the need for pasteurization and refrigeration for product safety are powerful incentives to locate milk production and processing as close to urban markets as is possible.

According to the National Agricultural Statistics Service (NASS) Survey from 2013, all the states defined in our Northeast study region have operating dairy farms, and two of the Northeast states, New York and Pennsylvania, are in the top five producing states (Table A.2.). The two leading states are California and Wisconsin.

**TABLE A.2: Top Producing Dairy States, 2013**

<b>State</b>	<b>Production</b>	<b>Value of production</b>
	<i>million lbs</i>	<i>\$ million</i>
California	41,801	6,906
Wisconsin	27,224	5,281
Idaho	13,558	2,427
New York	13,196	2,560
Pennsylvania	10,493	2,099

Source: USDA, NASS Milk Production, Disposition, and Income, 2014 Summary. April 2015. <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1105>.

While no formal survey data exist that report average distances traveled for fluid milk products, Nicholson, Gómez and Gao estimated that the average distance from supply areas to demand locations in the U.S. was about 112 miles in May 2006, assuming least-cost transportation routes.<sup>7</sup>

<sup>7</sup> Nicholson, C.F., Gómez, M.I., Gao, H. 2011. "The Cost of Increased Localization for a Multiple-Product Food Supply Chain: Dairy in the United States." *Food Policy*, 36 (2): 300-310.

Almost 29 percent of all U.S. dairy farm operations are located in the Northeast (Table A.3.). The farms tend to be smaller than average, and the Northeast has about 15 percent of the total number of milk cows and slightly less than 15 percent of milk production in the U.S.

**TABLE A.3: 2013 U.S. and Northeast Milk Production Statistics**

Source	Variable	U.S.	Northeast	Northeast, % of U.S.
	Number of milk cow operations	50,556	14,409	28.5
1	Number of milk cows	9,233,000	1,424,700	15.4
1	Milk production, <i>million lbs.</i>	201,218	29,480	14.7
1	Value of milk production, \$	\$40,477,414	\$6,299,328	15.6
1	Milk per cow, <i>lbs.</i>	21,822	20,692	94.8
1	Milk farm price, <i>\$/cwt</i>	\$20.1	\$21.4	106.5
2	Retail price, whole, <i>per gallon</i>	\$3.46	na	na
3	Per capita consumption, plain milk, <i>gallons</i> <sup>1</sup>	17.5	na	na

<sup>1</sup> Plain milk includes all fluid, unflavored milk, including whole, 1%, 2%, and skim milk.

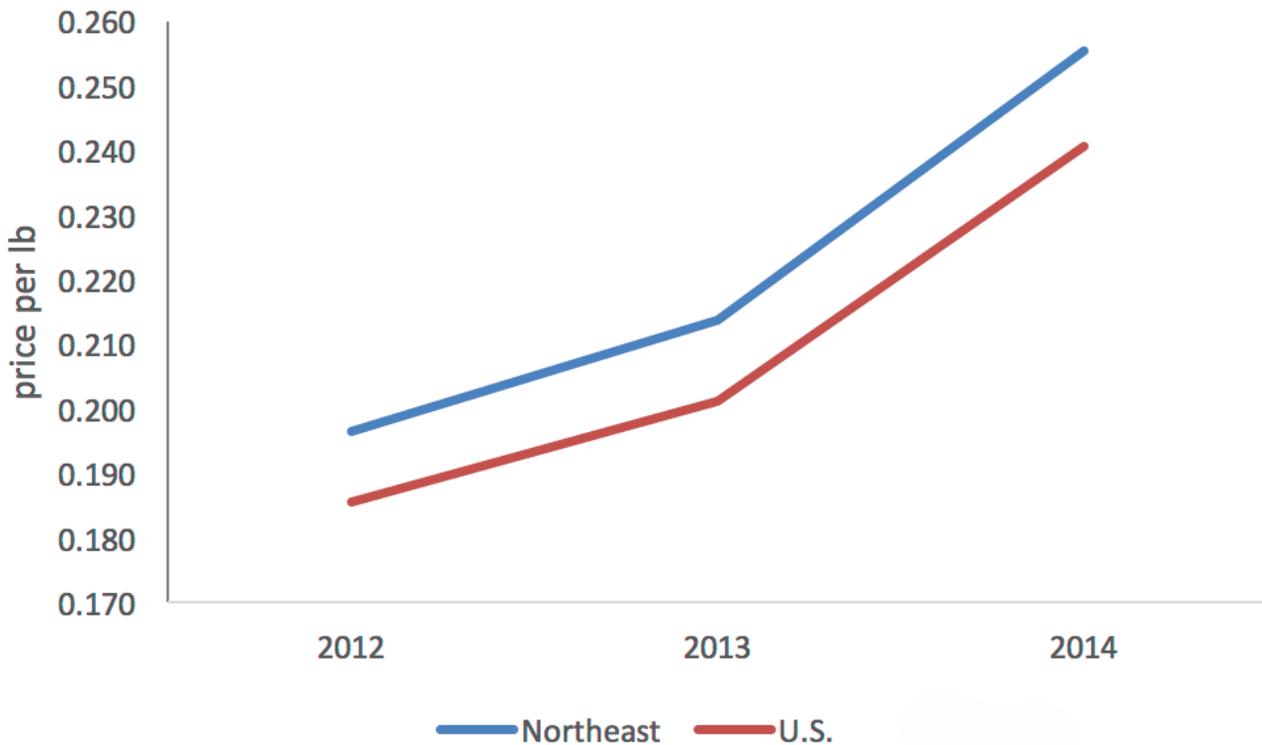
Sources:

<sup>1</sup> USDA, *NASS Milk Production, Disposition, and Income, 2014 Summary*. April 2015. <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1105>.

<sup>2</sup> Bureau of Labor Statistics, Consumer Price Index-Average Price Database. <http://www.bls.gov/cpi/>.

<sup>3</sup> USDA, ERS, *Food Availability Data System*. <http://www.ers.usda.gov/data-products/food-availability-%28per-capita%29-data-system/.aspx#26675> accessed 7-30-2015.

Farm milk prices between 2012 and 2014 increased markedly, despite higher production, due to stronger demand for processed products and exports (Figure A.2.). Strong international prices for dairy products increased U.S. farm gate prices in 2014.

**FIGURE A.2: Milk Price Received, Price per Pound 2012 – 2014<sup>1</sup>**

<sup>1</sup> Before deductions for items such as hauling and stop charges, advertising and promotion costs, and coop dues. It does not include hauling subsidies, but does include premiums and discounts for quality, quantity, or other reasons.

Source: USDA, NASS, QuickStats. <http://quickstats.nass.usda.gov/>.

### Frozen Broccoli Industry Profile

According to the USDA Economic Research Service, 2.6 pounds of frozen broccoli were available per capita in the U.S. in 2015 (Table A.4.). In 2015, 5.9 pounds of fresh broccoli, almost twice that of frozen, were available per capita. In 2013, the last year the USDA ERS collected retail price data, retail prices for fresh broccoli florets were also higher than for frozen broccoli.

**TABLE A.4: Broccoli—Average Retail Price per Pound and per Capita Consumption**

Form	Average retail price per pound, 2013	Per capita availability, 2015
		<i>pounds</i>
Fresh	-	5.9
Florets	2.57	-
Head	1.64	-
Frozen	1.87	2.6

Sources: USDA, ERS. "USDA ERS - Fruit and Vegetable Prices." Accessed February 10, 2017. <https://www.ers.usda.gov/data-products/fruit-and-vegetable-prices.aspx#.Ua5GqjxZ56I%20>. and USDA, ERS Food Availability (Per Capita) Data System. Accessed January 19, 2017. <https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/>.

While approximately 80 percent of the 2015 fresh broccoli supply in the U.S. was produced domestically, 82 percent of frozen broccoli consumed in the same year was imported.<sup>8</sup> Indeed, in 2015 broccoli accounted for about 30 percent of all frozen vegetable imports. Frozen broccoli imports come primarily from Mexico, Guatemala, and Ecuador (Table A.5.).

**TABLE A.5: Frozen Broccoli, Cut/Reduced in Size: U.S. Imports from Selected Countries, 2015**

Trade partner	Volume	% of total volume	Value	% of total value
	<i>1,000 pounds</i>	<i>percent</i>	<i>1,000 dollars</i>	<i>percent</i>
Mexico	444,974	78.9%	247,165	80.9%
Guatemala	62,019	11.0%	28,440	9.3%
Ecuador	38,334	6.8%	22,153	7.2%
China	15,568	2.8%	5,299	1.7%
TOTAL	564,283		305,379	

Source: USDA, ERS. "Data by Commodity - Imports and Exports." Accessed February 10, 2017. [https://data.ers.usda.gov/reports.aspx?programArea=veg&stat\\_year=2008&top=5&HardCopy=True&RowsPerPage=25&groupName=Vegetables&commodityName=Broccoli&ID=9457#P09f71a77e64d48e8abb51897a0ab1c10\\_9\\_384](https://data.ers.usda.gov/reports.aspx?programArea=veg&stat_year=2008&top=5&HardCopy=True&RowsPerPage=25&groupName=Vegetables&commodityName=Broccoli&ID=9457#P09f71a77e64d48e8abb51897a0ab1c10_9_384).

<sup>8</sup> USDA, ERS Food Availability (Per Capita) Data System. Accessed January 19, 2017. <https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/>.

From 2011-2015 the volume of frozen broccoli imports remained steady while the total value grew (Table A.6.).

**TABLE A.6:** Frozen Broccoli Imports: Volume and Value

	<b>Volume</b>	<b>Value</b>
	<i>1,000 lbs.</i>	\$
2011	607,354	291,400,870
2012	584,789	288,213,977
2013	515,093	264,692,431
2014	573,756	295,000,000
2015	564,293	305,379,000

Source: USDA, ERS, "Data by Commodity - Imports and Exports." Accessed February 10, 2017. [https://data.ers.usda.gov/reports.aspx?programArea=veg&stat\\_year=2008&top=5&HardCopy=True&RowsPerPage=25&groupName=Vegetables&commodityName=Broccoli&ID=9457#P09f71a77e64d48e8abb51897a0ab1c10\\_9\\_384](https://data.ers.usda.gov/reports.aspx?programArea=veg&stat_year=2008&top=5&HardCopy=True&RowsPerPage=25&groupName=Vegetables&commodityName=Broccoli&ID=9457#P09f71a77e64d48e8abb51897a0ab1c10_9_384).

Data on domestic broccoli production do not differentiate production for frozen versus fresh use, and USDA does not report broccoli production statistics by state. But in Atallah, et al. 2014,<sup>9</sup> authors estimated broccoli acreage and yield for several states using USDA statistics and local verification. Overall, California and Arizona dominate production, but several states in the Northeast also have significant summer and fall production by higher numbers of smaller farms (Table A.7.).

<sup>9</sup> Atallah, Shady S., Miguel I. Gómez, and Thomas Björkman. "Localization Effects for a Fresh Vegetable Product Supply Chain: Broccoli in the Eastern United States." *Food Policy* 49, Part 1 (December 2014): 151–59. doi:10.1016/j.foodpol.2014.07.005.

**TABLE A.7:** Estimated Broccoli Acreage and Yields in Eastern and Western States.

	Broccoli acreage				Number of farms	Yield (21-pound boxes/acre)
	<i>Spring</i>	<i>Summer</i>	<i>Fall</i>	<i>Winter</i>		
Maine	0	3,300	2,200	0	71	500
Maryland	0	145	145	0	40	400
New Jersey	0	69	69	0	74	450
New York	0	400	400	0	270	450
Pennsylvania	0	100	100	0	218	550
<b>Total Eastern U.S.</b>	<b>0</b>	<b>4,014</b>	<b>2,914</b>	<b>0</b>	<b>673</b>	<b>n/a</b>
Arizona	5,000	0	5,000	15,000	44	600
California	32,650	32,650	32,650	32,650	416	800
<b>Total Western U.S.</b>	<b>37,650</b>	<b>32,650</b>	<b>37,650</b>	<b>47,650</b>	<b>460</b>	<b>n/a</b>
<b>Total U.S.</b>	<b>39,741</b>	<b>36,824</b>	<b>42,069</b>	<b>48,706</b>	<b>1450</b>	<b>n/a</b>
North Eastern share (%)	0	11	7	0	46	n/a
Western share (%)	95	89	89	98	32	n/a

Source: Atallah, Shady S., Miguel I. Gómez, and Thomas Björkman. "Localization Effects for a Fresh Vegetable Product Supply Chain: Broccoli in the Eastern United States." *Food Policy* 49, Part 1 (December 2014): 151–59. doi:10.1016/j.foodpol.2014.07.005.

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2017-09	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Kent Store 1, Delaware		Park, K.S., Gomez, M. and K. Clancy
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