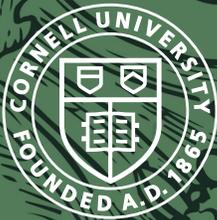


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CASE STUDIES OF SUPERMARKETS AND  
FOOD SUPPLY CHAINS IN LOW-INCOME  
AREAS OF THE NORTHEAST:

# BALTIMORE STORE 2, MARYLAND

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Case Studies of Supermarkets and Food Supply Chains in Low-Income Areas of the Northeast: Baltimore Store 2, Maryland. By Kristen S. Park<sup>1,4</sup>, Miguel Gómez<sup>2</sup>, Kate Clancy<sup>3</sup>, Extension Bulletin 2017-07. Charles H. Dyson School and Applied Economics and Management, College of Agriculture and Life Sciences, Cornell University, Ithaca, NY 14853.

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*The authors would like to acknowledge the enormous contributions of the store participants. In addition we would like to thank the EFSNE project investigators for their support to the case studies and to Elaine Hill, Bobbie Smith, III, Irin Nishi, Susan Parker, Derek Simmonds, and Dan Kane for their interviews and data collection efforts.*

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# Baltimore Store 2, Maryland

## 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 from 2013 to 2014. Fictitious names are used to maintain confidentiality of the case study participants.

## Place: Baltimore, MD

This case describes one retail grocery store in a neighborhood of Baltimore, Maryland and two of its product supply chains. The Baltimore neighborhood has a population of about 49,345 (Table 1) with a median household income of about \$56,221, lower than the median household income for Maryland, \$74,149. Almost 20 percent of the individuals in the neighborhood are impoverished. The neighborhood has a larger Hispanic population (19.0 percent) relative to the rest of the city (4.6 percent) and the state (8.8 percent).

The U. S. Census Bureau reports 31 grocery stores, excluding convenience stores, 34 convenience stores, and no warehouse clubs or supercenters in the neighborhood. The neighborhood thus contains 6.3 grocery stores per 10,000 residents compared to 1.9 in the county and 2.1 in the state (Table 1). The concentration of food retailers per 10,000 persons is included in Table 1 to illustrate how this compares to county and state metrics.

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.

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<sup>1</sup> The neighborhood is defined as the zip code that contains the store.

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

	<b>Neighborhood zip code</b>	<b>Baltimore</b>	<b>Maryland</b>
<b>DEMOGRAPHICS</b>			
<i>Population and Age</i>			
Population <sup>1</sup>	49,345	817,720	5,887,776
Median age <sup>1</sup>	32.5	39.1	38.1
Less than 5 years of age <sup>a,1</sup>	7.3%	6.0%	6.2%
Average household size <sup>1</sup>	2.58	2.54	2.67
<i>Education</i>			
High school degree or higher <sup>a,1</sup>	76.8%	90.2%	89.0%
Bachelor's degree or higher <sup>a,1</sup>	31.5%	36.0%	37.3%
<i>Race and Ethnicity</i>			
African American or Black <sup>a,b,1</sup>	20.6%	28.2%	31.1%
Hispanic <sup>a,c,1</sup>	19.0%	4.6%	8.8%
<i>Poverty and Program Participation</i>			
Poverty rate <sup>a,1</sup>	19.3%	9.1%	10.0%
Food insecurity rate <sup>a,2</sup>	12.9%	12.7%	13.4%
Share SNAP recipients <sup>a,d,1,3</sup>	N/A <sup>e</sup>	13.4%	13.4%
<i>Income</i>			
Median household income <sup>1</sup>	\$56,221	\$66,940	\$74,149
<b>FOOD ENVIRONMENT</b>			
Grocery stores <sup>f,4</sup>	6.3	1.9	2.1
Convenience stores <sup>f,4</sup>	6.9	3.2	1.2
Warehouse clubs and supercenters <sup>f,4</sup>	0	0.13	0.10

**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/saie/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>.

“

...30 percent of the store's sales are Supplemental Nutrition Assistance Program (SNAP) sales.

”

## Baltimore Store 2

Baltimore Store 2 is an independent supermarket that has been in operation for 35 years, since 1978.<sup>1</sup> It is characterized as a supermarket with annual sales of about \$20 million. The store is smaller than the average U.S. supermarket, being 21,000 square feet, of which 5,000 is storage. The store employs 40 full-time and 50 part-time people.

Although the store is much smaller than the average supermarket (Table 2), its weekly sales are greater than the average store, and thus its estimated weekly sales per square foot is over twice as great as the average. In addition, its weekly sales per full-time employee are estimated as \$5,917 compared to the U.S. average of \$4,423. This is even while 30 percent of the store's sales are Supplemental Nutrition Assistance Program (SNAP) sales.

**TABLE 2: U.S. Store Operations versus Baltimore Store 2**

	<b>Baltimore Store 2</b>	<b>2013 U.S. average</b>
Store selling space	16,000 sq ft	33,250 sq ft
Weekly sales	\$384,615	\$318,462
Weekly sales per sq ft of selling area	\$24.04	\$9.58
Weekly sales per full-time equivalent employee	\$5,917est.	\$4,423

Source: Progressive Grocer, "81st Annual Report of the Grocery Industry." April 2014.

The store has a contract to buy at least 40 percent from its primary grocery wholesaler, Grocery Wholesaler. In general, an independent store will need the services of a grocery wholesaler. A multi-year agreement is usually required to guarantee the wholesaler enough volume to maintain distribution services to the store. In addition, the store usually is able to receive a number of services offered by the wholesaler, including advertising and promotion program planning, flyer development, layout, and production, architectural and store construction planning and design, market research, store shelf layouts, accounting, bookkeeping, check writing, and more.

In addition to purchasing from Grocery Wholesaler, the stores purchases from roughly 50-70 other suppliers and sells a complete array of products. Fresh meat is the largest food department and accounts for 22 percent of store sales, while produce accounts for 15 percent. These two departments, meat and produce, contribute more to the store than the average supermarket (Table 3) and are important profit drivers with high gross margins. They are also very important to customers. According to the Food Marketing

<sup>1</sup> Although this case study is written in the present tense, it is meant to provide a snapshot in time, and the authors make no claim that the data reflect anything other than the store's situation at the time of the interview in 2013.

Institute’s 2014 Shopper Trends report, when consumers were asked the importance of features when selecting their primary store, they answered, “high quality fruits and vegetables” as the leading feature and “high quality meat” as the third feature behind “low prices.”

**TABLE 3: Percent of Store Sales by Various Departments and Categories**

Department or Category	Percent of Store Sales	
	Baltimore Store 2	Industry average
Produce	15.0	11.3
Fresh Meat (incl. poultry)	22.0	13.8
Fluid Milk	2.0	2.4
Canned fruits and vegetables	1.5	1.0
Frozen fruits and vegetables	0.5	1.0
Bread (loaf/bagged, not bakery goods)	1.0	3.0

Source: *Progressive Grocer*, “Consumer Expenditures Study: Stretching Dollars”. July 2014; Store interview.

The overall gross margin for the store is 25 percent. Gross margin is the difference between the purchase price and selling price divided by the selling price and 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>

The store president said that sales in the last three years have grown, and he sees sales in the next three years continuing to grow if everything stays the same, although he doesn’t know if competition will change things. He sees the store being in business in 10 years.

When asked what factors limit the store’s ability to procure regionally produced foods from the Northeast, the president did not report any major limiting factors.

Factors that limit the store’s ability to sell healthy foods were the quality of the products and the lack of demand, and these factors were deemed major limitations. An exception to this is the store’s high demand for fresh produce.

#### **Market basket items – Canned Peaches and Frozen Broccoli**

Del Monte is the leading brand of canned peaches in the store. In addition, the store sells two private label brands. The majority of canned peaches, roughly 75 percent, sold in Baltimore Store 2 are the healthier versions, such as those packed in clarified juice. Only

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

25 percent of canned peach sales are of those packed in heavy syrup. The prices for the healthier products versus those in heavy syrup are the same.

Baltimore Store 2's leading brand of frozen broccoli is a regional brand which accounts for 30 percent of the store's frozen broccoli sales. The store also sells two national brands and a private label brand of frozen broccoli. Seventy percent of all frozen broccoli sales are for broccoli without sauce, while the remainder, 30 percent, are for broccoli with sauce.

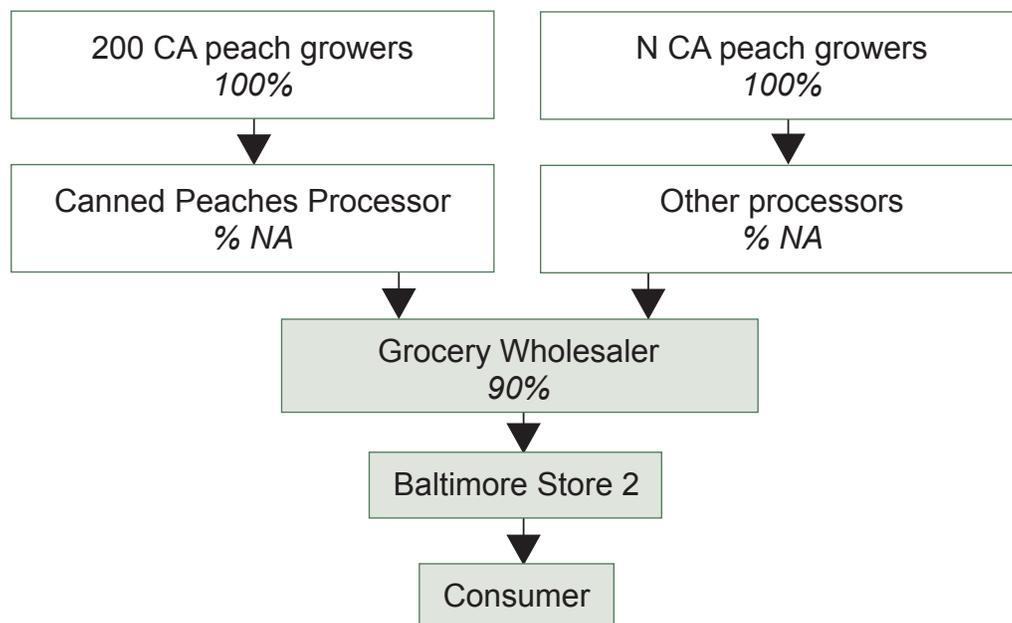
## Supply Chains

We traced the supply chains of two of our market basket products sold by Baltimore Store 2, canned peaches and frozen broccoli, to determine the sources of these foods and the extent of regional food system participation.

### Product 1: Canned Peaches

Figure 1 depicts the general supply chain for Baltimore Store 2 canned peaches. 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, the numbers indicate the percent of the next member of the supply chain's canned peaches they provide. Grocery Wholesaler provides 90 percent of Baltimore Store 2's canned peaches.

**FIGURE 1: Canned Peaches Supply Chain for Baltimore 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.

NA=not available.

Source: Author's calculations based on case interviews.

“

Most U.S. consumers purchase the "lighter" options [for canned peaches] rather than the peaches in heavy syrup.

”

The store places orders twice per week to Grocery Wholesaler, an online portal and receives orders the next day. Truck delivery is charged separately from the cost of the food products. The store has a contract with the wholesaler to buy \$45 million of product over five years and to buy no less than 40 percent of the store's products from the wholesaler.

Payment is expected in seven to eight days. The wholesaler collaborates on marketing and offers services, including category management, advertising, and market share data.

#### *Grocery Wholesaler*

The store purchases 90 percent of its canned peaches from Grocery Wholesaler, which provides a broad line of grocery products to retail customers. The store has used the wholesaler for 40 years. The wholesaler sells a number of brands of canned peaches, including Del Monte, its leading brand, Dole, and two private label brands. The wholesaler's canned fruits and vegetables sales represents less than one-half of 1 percent of their total annual sales.

#### *Canned Peach Processor*

Canned Peach Processor is the manufacturer of one of the private labels sold by Baltimore Store 2. The processor's canning plant is in California where it packs peaches, apricots and pears. It does not freeze any fruit. Three other fruit processors also can peaches in California.

The processor contracts with about 200 growers to produce the cling peaches used in canning. On average, the peach orchards are about 50 acres. Peaches are hand-picked; brought to a receiving station where they are assembled and graded by USDA inspectors then shipped to the plant where they are re-graded before processing.

The plant only cans peaches for about 50 days, when the fruit is in season. Peaches are packed in heavy syrup, light syrup, artificial sweetener, clarified white grape juice, or pear juice. Off-grade pears are squeezed for juice in the plant and this juice is stored for next season's packing juice.

Most U.S. consumers purchase the "lighter" options rather than the peaches in heavy syrup. The costs of production for peaches in heavy syrup versus the other options are almost identical, and the processor prices them all the same. This makes it easier for the wholesaler or retailer customer to manage operating systems that track cost of production and store prices.

The advantages to having the peach canning operation in California include the large-scale agriculture and growing conditions that provide superior production yields. For example, grower costs on the West coast are about half of that on the East coast because yields are so much greater.

One disadvantage to having production concentrated in such a relatively small growing area is great risk of production losses due to bad weather, labor shortages, or high pest loads. Another disadvantage is the greater transportation distances to large markets on the East coast. The processor believes that the advantages far outweigh the disadvantages.

Canned peaches are moved by rail from the processing plant to a consolidation warehouse on the East coast, and then trucked to Grocery Wholesaler. The wholesaler can order mixed loads with multiple canned products, which is an advantage to them.

The processor collaborates with Grocery Wholesaler on trade promotions. Although the processor establishes a price for the year, it might offer extra pricing or promotions if case sales have been slow or if it has extra product to move.

### **Regional Comparisons**

In this section we examine a national canned peach supply chain in lieu of a regional canned peach supply chain. We examine the supply chain movement of peaches from the national processors that supply the leading private label brand.

Table 4 shows the price margin<sup>3</sup> per can of peaches received by each member of the supply chain. In addition, it indicates the percent of the total retail price received by each member calculated from the member's price margin. For example, the grower member in the supply chain received on average \$0.16 per can and 12.7 percent of the final retail price. The price margin for the processor was approximately \$0.60 or 46.8 percent of the final retail price. We note that the price margin is what is left to pay for all other business expenses and profits. It is not an indication of profitability, as costs vary widely by industry and businesses within industries.

In general, most of the value-added activities for canned peaches are in the processing or canning stage. The peach growers and Grocery Wholesaler each receive lower price margins. The price margin received by the store for a can of peaches, \$0.34, is to pay for all the store operations, ownership investments, and profits accrued to canned peaches. In general, shelf stable products, such as packaged and canned goods, cost less in store operations than perishable items which usually require refrigeration, special fixtures, more labor to rotate and stock product, and have more spoilage.

The price margin received by Grocery Wholesaler, in this case, includes transportation to the store.

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

**TABLE 4: Allocation of Retail Price in Baltimore Store 2 Canned Peaches Supply Chain**

	<b>National</b>	
	<b>Leading private label brand</b>	
<b>Supply chain segment</b>	<i>Price margin (\$/can) 1</i>	<i>% of retail price</i>
Peach Growers	0.16	12.7
Canned Peach Processor	0.60	46.8
Transport <sup>2</sup>	0.10	7.8
Grocery Wholesaler <sup>3</sup>	0.08	6.3
Baltimore Store 2	0.34	26.4
<b>Total Retail Price</b>	<b>1.29</b>	<b>100.0</b>

<sup>1</sup> Can= 15 oz

<sup>2</sup> Transportation from processor to wholesaler distribution center

<sup>3</sup> Includes transportation to retail store

Source: Author's calculations based on case interviews

Table 5 depicts estimates of the distance and fuel used to get canned peaches from the producer to the retailer. Transportation from the canned peach processor in California to its regional warehouse consumes the most fuel per hundredweight of product.

**TABLE 5: Food Miles and Fuel Use in Baltimore Store 2 Canned Peaches Supply Chain**

	<b>Food miles</b>	<b>Transport miles<sup>1</sup></b>	<b>Truck capacity</b>	<b>Fuel use<sup>2</sup></b>	<b>Fuel use per cwt shipped</b>
<b>Supply chain segment</b>	<i>number</i>		<i>cwt</i>	<i>gallons</i>	
Canned Peach Processor to warehouse <sup>3</sup>	2,738	2,738	1,400	464	0.33
Warehouse to Grocery Wholesaler	295	295	400	49	0.12
Grocery Wholesaler to Baltimore Store 2	98	196	400	33	0.08
<b>All segments</b>	<b>3,131</b>	<b>3,229</b>		<b>546</b>	<b>0.54</b>

<sup>1</sup> Truck miles are equal to food miles when canned peaches travel over 150 miles.

<sup>2</sup> Trailer trucks used for shipping canned peaches across all segments have a capacity of 40,000 pounds and obtain 6 miles per gallon.

<sup>3</sup> Rail trains used to transport canned peaches from Canned Peach Processor to its warehouse have the capacity of 70 tons pounds and obtain 413 ton-miles per gallon. - <http://www.ams.usda.gov/AMSV1.0/RuralTransportationStudy>

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

“  
A regional supply chain for canned peaches does not exist for Baltimore Store 2.

”

### Prospects for Expansion of Regional Food System: Canned Peaches

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 canned peaches does not exist for Baltimore Store 2. As a matter of fact, over 90 percent of all canned peaches sold in the U.S. originate in California.

However, some value-added activity, mainly in wholesaling and retailing, is conducted in the region. The supply chain stream that we examine in this case starts with peaches grown in California. This stream includes activities from California peach growers' production, from the canned peaches processor, from the grocery wholesaler, and from Baltimore Store 2 retailer. If we assume that the retail price share is a proxy for the amount of value-added activity produced by each supply chain member, and if we add the retail price shares of the two members located in the region, Grocery Wholesaler and Baltimore Store 2, we can say that this represents the amount of value-added activity in the region.

The sum of the regional activities by Grocery Wholesaler and Baltimore Store 2 is \$0.42 or 32.7 percent of the retail price (Table 6). This means 32.7 percent of the value-added activities from this canned peach supply chain is being conducted in the region. The activities are in wholesaling and retailing.

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

**TABLE 6:** Extent of Regional Value-Added Activity in the Baltimore Store 2 Canned Peaches Supply Chain

	Value-added retained by supply chain member <sup>1</sup>	Extent of regional value-added activity <sup>2</sup>
<b>Supply chain segment</b>	<i>% margin of retail price</i>	
California canning peaches growers	12.7	
Canned Peaches Processor	46.8	
Transportation	7.9	
Grocery Wholesaler	6.3	6.3
Baltimore Store 2 retailer	26.4	26.4
All segments		
Added-value performed in region		32.7%

<sup>1</sup> This column contains the % margins of retail price from Table 4 above.

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

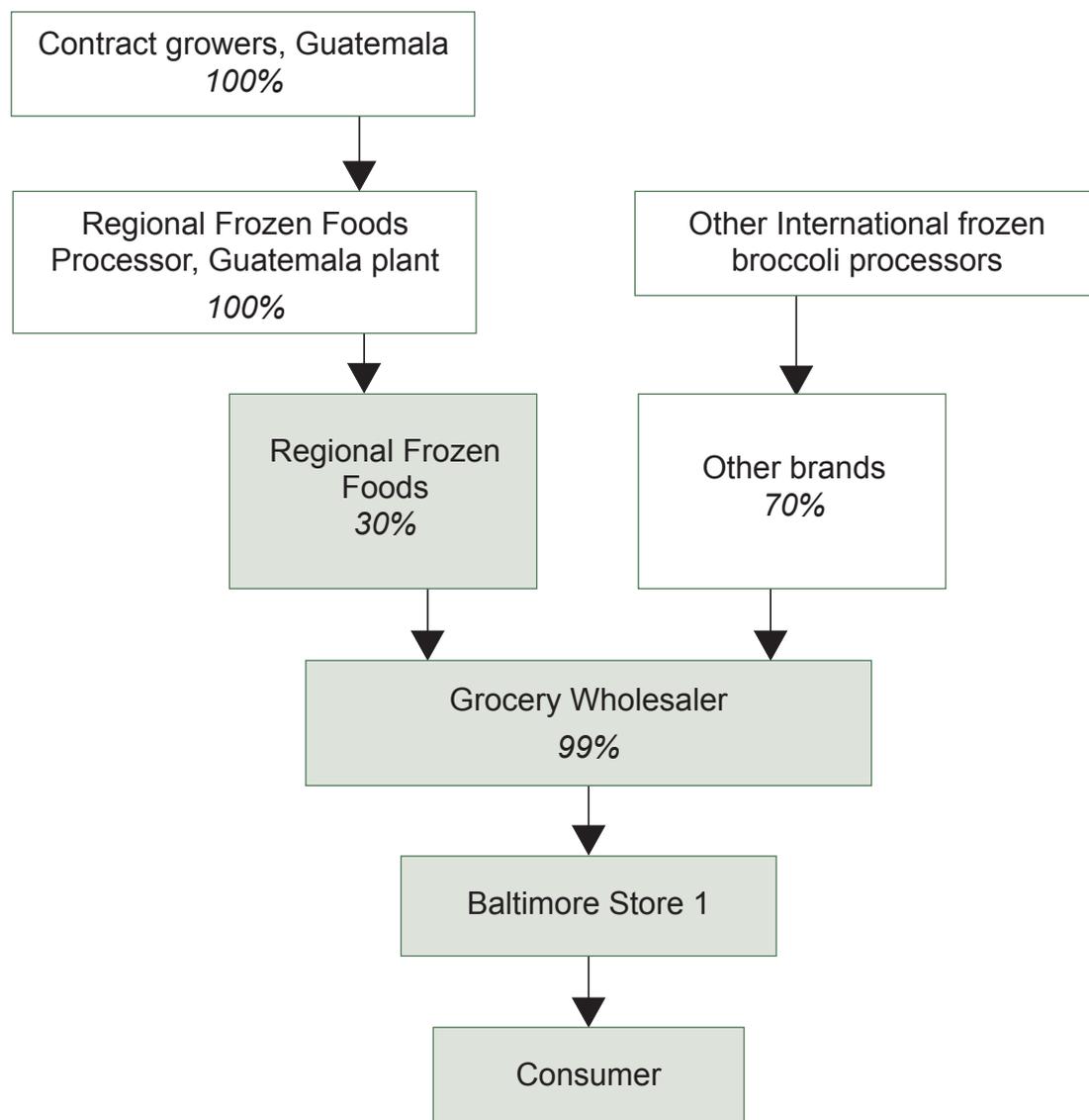
**Note:** Shaded rows indicate supply chain members located in the Northeast.

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

### Product 2: Frozen Broccoli

Figure 2 depicts the general supply chain for Baltimore Store 2 frozen broccoli. Starting at Baltimore Store 2 and tracing back, the numbers indicate the percent of the next member of the supply chain's apples they provide. Grocery Wholesaler provides 100 percent of Baltimore Store 2's frozen broccoli. We investigate the frozen broccoli supply chain from the store to Regional Frozen Foods. Information about the remaining supply chains was not available.

**FIGURE 2:** Frozen Broccoli Supply Chain for Baltimore 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.

“  
Regional Frozen  
Foods purchased  
the [Guatemalan]  
plant in order  
to control the  
processes it felt it  
needed to have in  
place to produce  
safe, quality  
products.”

### Suppliers

The store’s primary grocery wholesaler supplies 100 percent of its frozen broccoli. The wholesaler purchases from a regional processor as well as from processors producing national brands and a private label brand.

For over 90 years, Regional Frozen Foods has been growing, processing, and packaging a variety of food items including frozen vegetables, frozen pretzels, canned vegetables, canned beans, frozen beans, and refrigerated, fresh, and snack foods. The company sells products through retail, food service, military, club store and industrial venues.

All of the broccoli used in products produced by the company is grown, cut-up, and frozen in Guatemala. The plant is owned by the processor and broccoli is grown by small-scale farmers under contract. Regional Frozen Foods purchased the plant in order to control the processes it felt it needed to have in place to produce safe, quality products. They also wanted to control all the processes needed to comply with EPA regulations regarding pesticides, food safety, and imports.

Estimates for orders are received from their customers and transmitted through their corporate planners who give an estimate of the final volumes needed to the plant in Guatemala. The plant then determines how many acres of broccoli to plant.

The plant processes the broccoli which is frozen in-line and placed in 1,000-1,400 pound totes, loaded into containers with freezer units, and put onto ocean vessels and shipped to the U.S. The processor receives the product at their own repacking plant or at other contracted frozen storage facilities depending on where they will be shipping or handling the product.

The ocean vessels from Guatemala can land at various ports, depending on the traffic at the ports and other factors. Some of the ports used include Jacksonville, Florida up the east coast to Wilmington, Delaware. From the port, the broccoli is loaded onto tractor trailers and driven to temporary storage or directly to the plant.

Broccoli florets are most popular item. “Cuts” are made to different specifications and might contain about 50:50 floret vs stems. Size of cut or floret matters. For instance, industrial customers such as Heinz might want small florets for frozen dinners-this is more expensive than larger cuts of florets. Regional Frozen Foods processor has not had a request for organic frozen broccoli and, therefore, does not sell any organic frozen broccoli.

This processor sells up and down the East Coast, as far as Florida. Tractor trailers have capacity of 35,000-38,000 pounds of processed product.

### Regional Comparisons

In this section we examine an international frozen broccoli supply chain. Baltimore Store 2's leading brand of frozen broccoli is grown and processed in Guatemala; the product does not originate from any regional broccoli grower.<sup>4</sup> We examine the supply chain movement of frozen broccoli from Guatemala as an example of one of the store's frozen broccoli supply chains.

Table 7 shows the store's price margin's<sup>5</sup> per pound for its leading brand of frozen broccoli and its private label brand. Not enough information was gathered to determine the price margins of the other supply chain members. We note that the price margin is what is left to pay for all other business expenses and profits. It is not an indication of profitability.

The store's price margin from the regional brand, \$0.53 or 24.7 percent of the retail price, is almost half that of the private label brand, \$0.95 or 50.3 percent.

In general, private label products cost less for retailers and wholesalers than branded products, because the private label manufacturers do not have promotions and advertising costs associated with their products that branded manufacturers do. Even though private label goods usually have lower retail prices as well, the lower costs can generate larger profit margins than branded products can.

**TABLE 7: Price Margins for Frozen Broccoli Florets, Regional Brand versus Private Label**

Supply chain segment	Regional Frozen Foods-florets		Private Label-florets	
	Price margin (\$/16oz)	% of retail price	Price margin (\$/16oz)	% of retail price
Baltimore Store 2	0.53	24.7	0.95	50.3
Total Retail Price	2.13	100.0	1.89	100.0

Table 8 estimates the distance and fuel used to get frozen broccoli from Guatemala to the retailer. Despite a seventeen-hundred mile journey and over 250,000 gallons of bunker fuel for the ship, frozen broccoli transportation from Guatemala to Wilmington, DE was estimated as 0.08 gallons per hundredweight of product, less than all the domestic trucking legs combined. This is due to the ability of ocean vessels to transport very large amounts of cargo and the fuel efficiency of the vessel.

<sup>4</sup> Over 95 percent of frozen broccoli sold in the U.S. is imported. The top three countries of origin for frozen broccoli are Mexico, Guatemala, and Ecuador. Source: Foreign Agricultural Service, BICO reports at: <https://apps.fas.usda.gov/GATS/BICORreport.aspx>

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

**TABLE 8: Food Miles and Fuel Use in Baltimore Store 2 Frozen Broccoli Supply Chain**

	Food miles	Transport miles <sup>1</sup>	Vehicle capacity	Fuel use <sup>2</sup>	Fuel use per cwt shipped <sup>3</sup>
Supply chain segment	<i>number</i>		<i>cwt</i>	<i>gallons</i>	
Guatemala to Wilmington, DE	1,718	1,718	3,200,000	254,864	0.08
Wilmington, DE to Regional Frozen Foods	108	108	400	18	0.05
Regional Frozen Foods to Grocery Wholesaler	60	120	400	39	0.05
Grocery Wholesaler to Baltimore Store 2	98	196	400	33	0.08
All segments	1,984	2,142		254,934	0.26

<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 the U.S. have a capacity of 40,000 pounds per twenty-foot equivalent unit (TEU) and obtain 150 tons of bunker fuel per day of cruising (assuming 8000 TEU capacity) (<https://people.hofstra.edu/geotrans/index.html>). Ocean travel from Guatemala to Northeast ports takes an average of five days.

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 (8000 TEU) is being used

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

### **Prospects for Expansion of Regional Food System: Frozen Broccoli**

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 Baltimore Store 2. As a matter of fact, over 95 percent of all frozen broccoli consumed in the U.S. is imported.

However, some value-added activity, mainly in wholesaling and retailing, is conducted in the region. The supply chain stream that we examine in this case starts with frozen broccoli grown in Guatemala; however, the stream includes regional value-added activities from Grocery Wholesaler and from Baltimore Store 2 retailer. We assume that the retail price share is a proxy for the amount of value-added activity produced by each supply chain member. Although we do not know the retail price share for frozen broccoli sold by Grocery Wholesaler to Baltimore Store 2, we know that the retail price share for the store is 24.7 percent for the product supplied by the regional brand and 50.3 percent for the private label. These leave out some of the value-added activity added within the region undoubtedly conducted by Regional Frozen Foods and by Grocery Wholesaler.

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

## Key Lessons for Baltimore Store 2

Baltimore Store 2 is a small, independent supermarket located in the city of Baltimore, MD. It purchases most of its supplies from Grocery Wholesaler but also purchases from other suppliers. The product supply chains described in this case are canned peaches and frozen broccoli.

### The Store and Its Environment

#### Effect of size and economies of scale

- Baltimore Store 2 is a small supermarket of approximately 7,500 square feet and solely-owned. The store carries all the types of products that larger supermarkets do, including meats, produce, and groceries. It also carries international foods in demand by its customers.
- Like most independent stores, it purchases most of its products from wholesalers rather than direct from the manufacturer. Independent stores are often smaller companies that procure primarily from wholesalers, intermediaries between manufacturers and the store. In comparison, self-distributing supermarkets are large enough and have enough stores that they usually purchase directly from manufacturers. This allows the larger companies to buy “in bulk” and achieve discounts provided by the manufacturer.
- The size of the store itself can affect operations costs for delivery, replenishment, and labor. Deliveries of smaller volumes are more costly and less efficient. Wholesalers and distribution centers often have to break apart full cases to pick individual items for small orders, and transportation is more expensive for small drop sizes.
- Despite the fact that Baltimore Store 2 is smaller and purchases primarily through wholesalers rather than direct, it significantly outperforms the average supermarket store in several key metrics: weekly sales, weekly sales per square foot, and weekly sales per full-time employee. Sales from its produce and meat departments also are significantly greater than average.

#### Presence of relationships

- The owner believes that relationships are one of the factors that supports his ability to stay in business.
- The owner reports an increase in demand for locally produced foods. As a result, he now has a buyer at an Amish produce auction to buy locally grown produce.

## Market Basket Supply Chains

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

- As an independent store, Baltimore Store 2 can choose its own suppliers and business partners and sculpt its selection or assortment of products to meet its customers' demands. Although Baltimore Store 2 has a contract to buy at least 40 percent from its primary grocery wholesaler, as noted above, the owner has requested and obtained new ethnic products through Grocery Wholesaler as well as from ethnic suppliers directly. Direct ownership has allowed the store to supply its customers with products they are interested in and not just products available from the company distribution center.

### **Effect of regional production/industry**

- The Northeast region does not produce significant amounts of frozen broccoli or canned peaches. Manufacturing plants for each of these products are located close to areas of commercial production of broccoli and peaches. 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.
- We cannot say anything about the relationship between regional production and length of the supply chain. Although neither frozen broccoli nor canned peaches sold by Baltimore Store 2 are produced or manufactured in the region, their supply chains are relatively short given the fact that it includes a grocery wholesaler. The canned peaches and frozen broccoli each has a medium-length supply chain with three members, including the grocery wholesaler, the manufacturer, and the growers.
- Frozen broccoli packages are labeled by country of origin, although this labeling is in small print and is not prominently displayed. Canned peaches are not labeled with a source identification, and a source identification will not likely benefit canner or retailer.

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

- Both frozen broccoli and canned peaches sold by Baltimore Store 2 are grown and manufactured outside the region. Despite this, some value-added supply chain activities are conducted in the region by Grocery Wholesaler and by the store itself. The value-added activities conducted regionally by Grocery wholesaler and the store are estimated as 32.7 percent for canned peaches; the regional value-added activities conducted by the store for frozen broccoli range from 24.7 – 50.3 percent depending on whether it is the regional brand or the private

label brand. Handling, storage, selling, and transportation activities were also conducted regionally by Regional Frozen Foods, but we were unable to gather and measure this information.

- 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. This is important because this translates into economic activity due to the distribution and retailing system which happens in the Northeast.

#### **Effect of geography/distance**

- The fuel use for the two products, canned peaches and frozen broccoli, are 0.54 and 0.26 gallons per hundredweight respectively.
  - The biggest competitive factors for the Northeast farms are most likely cost of transportation and proximity to market. These have been the biggest factors for decades, but because of increased transportation costs, government regulations on trucking, and deteriorating transportation infrastructure, these factors have become more important in the cost equation.
- Canned peaches are manufactured thousands of miles away; however, the manufacturer has a consolidation warehouse that accepts various products made by the company and holds inventory. This relieves the pressure on Grocery Wholesaler to hold more inventory in case of delays on shipments or other transportation uncertainties. The Regional Frozen Foods processor manages their shipments of frozen broccoli from Guatemala.

## Appendix

### Peaches Industry Profile

According to the USDA Economic Research Service Food Availability (Per Capita) Data System, peaches are the most popular canned fruit as measured by per capita consumption across the country. Canned peach consumption is slightly lower than fresh consumption (Table A.1.). Apples, including applesauce, is the second most popular canned fruit.

**TABLE A.1: Canned Peaches Consumption**

	<b>Canned</b>	<b>Fresh*</b>
	per capita use (processed weight)	per capita disappearance (retail availability)
	<i>lbs</i>	<i>lbs</i>
2010	3.63	4.73
2011	3.14	4.47
2012	3.14	3.86
2013	3.28	3.00
2014	3.07	3.26
2015	3.24	2.96

\*Includes nectarines.

Source: USDA, ERS, Fruit and Nut 2015 Yearbook. Noncitrus Fruit data set. <https://www.ers.usda.gov/data-products/fruit-and-tree-nut-data/yearbook-tables/#Noncitrus-Fruit>.

California is the leading producer of peaches, growing 42 percent of peaches for fresh consumption in 2015 and 97 percent of peaches for processing (Table A.2.).<sup>6</sup> Del Monte, Dole, Seneca Foods as well as Pacific Coast Producers and Treetop have canning plants in California.

In 2015, the Northeast produced about 7 percent by volume but 12.2 percent by value of total U.S. production. Data for fresh versus processing production in the Northeast are not available.

<sup>6</sup> USDA, NASS, Noncitrus Fruits and Nuts, 2015 Summary. <http://usda.mannlib.cornell.edu/usda/current/NoncFruitNu/NoncFruitNu-07-06-2016.pdf>.

**TABLE A.2: 2015 U.S. and Northeast Peach Statistics**

Source	Variable	U.S.	Northeast	Northeast, % of U.S.
1	Utilized production, total, <i>tons</i>	825,415	58,375	7.0%
1	Value of utilized production, Total \$ <i>thousands</i>	605,794	73,633	12.2%
1	Utilized production, canned, <i>tons</i>	339,540	na	na
1	Value of production, canned, \$ <i>thousands</i>	160,602	na	na
1	Grower price, canned, \$ per <i>ton</i>	473	na	na
2	Canned consumption per capita, <i>lbs</i>	3.24	na	na

*Sources:*

USDA, NASS, Noncitrus Fruits and Nuts, 2015 Summary. <http://usda.mannlib.cornell.edu/usda/current/NoncFruNu/NoncFruNu-07-06-2016.pdf>.

USDA, ERS, Fruit and Nut 2015 Yearbook. Noncitrus Fruit data set." <https://www.ers.usda.gov/data-products/fruit-and-tree-nut-data/yearbook-tables/#NoncitrusFruit>.

Although data on retail sales for canned peaches specifically were not available, retail sales growth of canned fruits in general showed mostly flat to negative year-to-year growth from 2012 to 2014 (Table A.3.).

**Table A.3. Changes in Retail Sales of Processed Fruits and Vegetables**

	% of retail grocery sales (2015)	% change vs year prior		
		2012	2013	2014
Frozen vegetables	0.26%	-2.4%	-0.7%	-2.4%
Canned vegetables	0.26%	-2.9%	-1.4%	-1.3%
Canned fruit	0.09%	-3.2%	-0.7%	-3.3%
Frozen juices, drinks	0.02%	-10.0%	-13.6%	-8.8%
Shelf-stable juice, drinks	0.51%	-3.5%	-3.7%	-3.0%
Total fresh produce	4.45%	1.8%	6.5%	4.4%

Source: "Consumer Expenditures Annual Report, 2015." 2016. Progressive Grocer.

Mintel, a data intelligence company, reported that private labels accounted for 31.4 percent of the canned/jarred fruit sales in 2015. Dole was the leading national brand with a 32.2 percent share followed by Del Monte with 29.5 percent.<sup>7</sup>

### 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
		pounds
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%20.1>; 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.).

<sup>7</sup> "Canned Fruit Sales by Brand: 2015." 2016. Mintel: Global Market Research & Market Insight. <http://www.mintel.com>.

<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/>.

**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
	1,000 pounds	percent	1,000 dollars	percent
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).

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**

	Volume	Value
	1,000 lbs.	\$
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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