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

MADISON COUNTY STORE, NEW YORK

Kristen S. Park, Miguel Gómez, Kate Clancy

Food Industry Management Program
Charles H. Dyson School of Applied Economics and Management
College of Agriculture and Life Sciences
Cornell University, Ithaca, NY 14853

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[1] Extension Associate, Charles H. Dyson School of Applied Economics and Management, Cornell University

[2] Associate Professor, Charles H. Dyson School of Applied Economics and Management, Cornell University

[3] Food Systems Consultant

[4] Author contact: 475C Warren Hall, Charles H. Dyson School of Applied Economics and Management, Cornell University, Ithaca, NY 14853-7801, ksp3@cornell.edu, +1-607-255-7215

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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 2011 to 2016. Fictitious names are used to maintain confidentiality of the case study participants.

Place: Madison County, NY

Madison County is rural, although some towns in the county are included in the standard metropolitan areas (MSA) of Syracuse or of Utica. Approximately 46 percent of the land area is used for agriculture, amounting to about 300 square miles of agricultural land.

The population of Madison County is 72,731 according to the U.S. Census Bureau. The community in which the store is located has a population of 1,745. Median household income for the zip code is $51,600, somewhat less than the median household income for New York State which is $58,687. The poverty rate is 10 percent, less than that for New York State.

Madison County has 14 grocery stores, excluding convenience stores, or approximately 1.9 grocery stores per 10,000 residents, while the community has one grocery store or a density of 5.73 grocery stores per 10,000 residents (Table 1). Although the community does not have any convenience stores or supercenters, the county has 23 convenience stores and gas stations with convenience stores.

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 Madison County Store

	Community zip code	Madison County	New York State
DEMOGRAPHICS			
Population and Age			
Population[1]	1,745	72,731	19,594,330
Median age[1]	47	40.1	38.1
Less than 5 years of age[a,1]	4.0%	4.9%	6.0%
Average household size[1]	2.49	2.55	2.62
Education			
High school degree or higher[a,1]	91.9%	90.4%	85.4%
Bachelor's degree or higher[a,1]	19.7%	27.2%	33.7%
Race and Ethnicity			
African American or Black[a,b,1]	2.6%	2.7%	17.0%
Hispanic[a,c,1]	0.3%	1.9%	18.2%
Poverty and Program Participation			
Poverty rate[a,1]	10.0%	11.2%	15.6%
Food insecurity rate[a,2]	11.8%	13.5%	12.7%
Share SNAP recipients[a,d,1,3]	N/A[e]	12.7%	16.3%
Income			
Median household income[1]	$51,600	$53,584	$58,687
FOOD ENVIRONMENT			
Grocery stores[f,4]	5.7	1.9	5.2
Convenience stores[f,4]	0.0	3.2	1.8
Warehouse clubs and supercenters[f,4]	0.0	0.1	0.1

Notes:

[a] Percentage of entire population.

[b] Alone or in combination with other races.

[c] Of any race.

[d] Calculated by dividing the number of SNAP recipients by the population.

[e] Data not available at the zip code level.

[f] Number per 10,000 people.

Sources:

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

[2] 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.

[3] 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.

[4] County Business Patterns Database, 2013, downloaded from 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.

Madison County Store

Madison County Store is an independent supermarket.[1] The current owners are a husband and wife team. The husband's family has been in the grocery business for about 60 years. This store was purchased by the couple about two years ago and is managed by them. The store has annual sales around $3 million with total selling space of 6,600 square feet and 1,000 square feet of storage (Table 2). Madison Store has an overall gross margin of 32 percent. Gross margin is defined as the difference between the cost and selling price divided by the selling price. The 2015 median gross margin for supermarkets reported by the Food Marketing Institute is 28 percent.[2]

Table 2. U.S. Store Operations versus Madison Store Operations

	Madison Store	2011 U.S. average
Store size	6,600 sq ft	33,320 sq ft
Weekly sales	$57,692	$307,306
Weekly sales per sq ft of selling area	$8.74	$9.22
Weekly sales per full-time equivalent employee	$3,979est.	$4,519

Sources: Food Marketing Institute, "Supermarket Facts" and Progressive Grocer, "79th Annual Report of the Grocery Industry." April 2012.

> "The owners make an active effort to include healthy foods but sometimes find it difficult to sell them due to a lack of demand."

The store offers a wide variety of fresh foods and has butcher space that provides fresh meat products. It offers an array of prepared foods, freshly baked bread and pastry products and plans to expand the produce section and enhance the size of the retail space. The owners make an active effort to include healthy foods but sometimes find it difficult to sell them due to a lack of demand. They make attempts to educate their customers to improve sales of fresh, healthy foods.

The store purchases many of its products from Regional Wholesaler, a general-line grocery wholesaler. The owner also buys from a number of other wholesalers and distributors, many of them carrying locally known brands.

In general, many independent supermarkets will need the services of a grocery wholesaler and under an agreement may

[1] The store owner interview was conducted in December 2011. 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.

[2] *The Food Retailing Industry Speaks 2016*. The Food Marketing Institute. Arlington, VA 22202.

purchase perhaps 50-60 percent of their goods from them. A multi-year agreement is usually required to guarantee the wholesaler enough volume to maintain distribution services to the store. The types of products typically provided under these relationships include dry groceries, frozen foods, paper supplies, and some portion of the meat, dairy, and produce departments. In addition, the store usually has the ability to contract 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, shelf planning and development, accounting, bookkeeping, check writing, and more.

The store owners are positive about the store's future. Sales have been increasing, and they expect to be in business in the community in the next ten years. When asked what external factors might be limiting their ability to stay in business, the owners reported that taxes and labor costs were major limiting factors. Other factors mentioned as being somewhat limiting were access to cash/credit/capital, zoning, and the size of the store.

Procuring regionally produced foods is somewhat difficult due to a couple of factors, the owners reported, primarily the limited availability of regional products and the expense of regional meat. In fact, the store owner feels that most fresh products are fairly easy to acquire within season, but that meat was a product that is not economically viable to procure regionally.

Market basket items – Fluid Milk and Ground Beef

Madison Store's dairy supplier is located 35 miles away, and the supplier, in turn, gets almost 100 percent of its milk from dairy farms in central New York.

The store sells about 17,000 gallons of milk per year, of which 12 percent, or about 2,000 gallons, is 1% milk. Nationally in 2012, 1% milk accounted for 17.8 percent of fluid milk (Table 3).

Table 3: U.S. Per Capita Consumption of Unflavored Fluid Milk, 2012

Unflavored fluid milks	Per capita consumption
	%
Whole milk	29.6
2% milk	36.1
1% milk	17.8
Skim milk	16.5
Total	100.0

Source:
Calculated by USDA, ERS based on data from various sources (see http://www.ers.usda.gov/data-products/food-availability-(per-capita)-data-system/food-availability-documentation.aspx).

The store purchases $7,000 per week of beef in three deliveries per week and grinds some of the cuts on-site to produce its ground beef. It charges around $4.29/pound for ground beef. The owner estimates that grinding its own meat adds an additional 20 percent to the store's costs for ground beef.

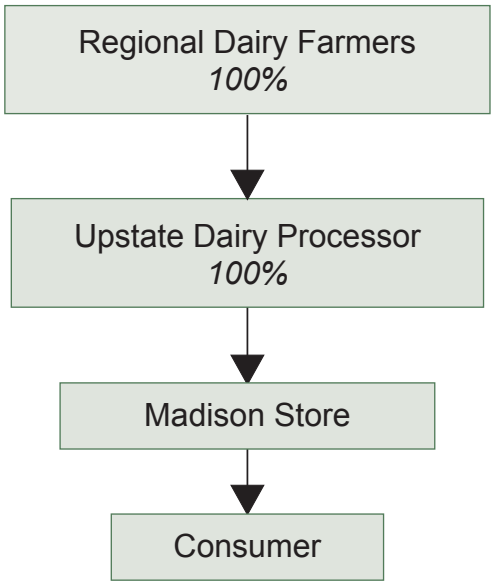
Supply Chains

We traced the supply chains of two of our market basket products sold by Madison Store, fluid milk and ground beef, to determine the sources of these foods and the extent of regional food system participation.

Product 1: Fluid Milk

Madison Store purchases milk and dairy products from Upstate Dairy Processor, a milk handler-processor located about 30 miles from the store. Figure 1 presents the fluid milk supply chain in a flow chart. Starting at the store and tracing back the supply chain, the boxes upstream indicate the percent of the downstream member's total purchases.

FIGURE 1: Fluid Milk Supply Chain for Madison Store



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.

Upstate Dairy Processor is a family-owned producer and distributor of milk that has been in business for about 80 years and is based in Central New York. Madison Store has used this processor for about 2.5 years and the owner's family has used it as a supplier for its former stores for over 60 years. It is the store's only supplier of milk.

Upstate Dairy Processor

Upstate Dairy Processor sources its raw milk from around 250 local farms that are, on average, 35 miles from its four dairy plants. It sources 99 percent of its milk from within New York and one percent from Vermont. The processor has about 530 full-time employees and receives around 50 million pounds of milk every month. Their annual sales are $290 million, of which, 55 percent is fluid milk sales. They also sell ice cream and many other dairy products.

> "Madison Store has only one fluid milk supply chain, and it is a regional supply chain."

The majority of the processor's sales are within the Northeast, with only 5 percent to customers outside the region. Close to 85 percent occur within New York State. They use a few descriptors on some of their milks they sell: for example, rbST[3]-free, organic, high calcium, high vitamins/minerals and good source of calcium.

Upstate Dairy Processor sales are very concentrated with its top five customers making up 85 percent of its sales. Madison Store is a very small customer ($9,200/month or $2,100/week) and accounts for less than one-tenth of a percent of Upstate Dairy Processor's sales.

The processor delivers milk to the store three times per week from a 30-60 foot panel van. The delivery person checks the refrigerated case and switches out the milk as needed according to the sell-by dates. Payment is expected weekly, and the store and the processor collaborate on sales promotions. Due to competitive retail prices at places like Sam's Club and Walmart, Madison Store says the store can only make $0.58 on a gallon of milk. Overall, Madison Store is very satisfied with its fluid milk supplier, although prices could always be improved.

Regional Comparisons

We define a regional supply chain as one where the product is produced, or grown, in the region. Madison Store has only one fluid milk supply chain, and it is a regional supply chain. Table 4 shows the price margin[4] per gallon of milk received by each member of the supply chain. In addition, it indicates the percent of total or proportion of the retail price received by each member calculated from the member's price margin. For example, the dairy farmer member's price margin for a gallon of milk is $1.82.

[3] Recombinant bovine somatotropin

[4] Price margin is defined here is the sale price minus the purchase price.

The price margin for the processor in the same supply chain is $1.69. 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.

In this supply chain, the farmer receives 44.2 percent of the retail price, a relatively large portion of the retail price compared to more highly processed products that usually return a smaller portion of retail. The processor, who pasteurizes, homogenizes, and packages the fluid milk, delivers to the retailer, restocks the dairy case, and handles product shrink, collects 41 percent of the retail price. The retailer receives only 14.1 percent of the retail price. This covers all the store expenses, including store labor, selling, physical store investments and fixtures. Every allocation of retail price also should cover expected profits for each supply chain member.

TABLE 4: Allocation of Retail Price in Madison Store Fluid Milk Supply Chain

Supply chain segment	Price margin ($/gallon)	% of retail price
Dairy farmer[1]	1.82	44.2
Transportation	0.03	0.7
Upstate Dairy Processor	1.69[2]	41.0
Madison Store[3]	0.58	14.1
Total Retail Price	4.12[3]	100.0

[1] USDA, NASS, QuickStats. 2013 price of milk per hundred weight for New York farmers converted to price per gallon, using conversion of 8.6 pounds per one gallon of milk.
[2] Wholesale milk price covers transportation and dairy case restocking expenses as well as processing costs.
[3] Store inventory price data 2013
Source: Author's calculations based on case interviews

Table 5 shows the average distance and fuel used to get milk from an average dairy farm in the supply chain to the retailer. Transportation from the processor to the store is the most costly fuel use in the supply chain measured by gallons of fuel per hundredweight shipped.

TABLE 5: Food Miles and Fuel Use in Madison Store's Fluid Milk Supply Chain

	Food miles	Truck miles[1]	Truck capacity	Fuel use[2]	Fuel use per cwt shipped
Supply chain segment	*number*		*cwt*	*gallons*	
Average dairy farm to Upstate Dairy Processor	35	70	619.2	12	0.02
Upstate Dairy Processor to Madison County Store	33	66	40.0	6	0.15
All segments	68	136		18	0.17

[1] Tank capacity is 7,200 gallons; one gallon of milk weighs 8.6 pounds.
[2] 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 Madison County Store 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 is generally considered to be self-sufficient in terms of milk production, meaning the Northeast supplies enough fluid milk to supply its needs. A few trends, such as the declining number of dairy farms, consumer population growth, and the increased amount of milk diverted to manufactured products, suggest the Northeast could reach a point of importing dairy products to meet some of its needs.

This regional supply chain performs 100 percent of the value-added activity in the supply chain (Table 6).

Table 6 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 4) 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 6 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 6: Extent of Regional Value-Added Activity in Madison Store Fluid Milk Supply Chain

	Percent of retailer's fluid milk supplies	Value-added[1]	Value-added retained by supply chain member	Extent of regional value-added activity[2]
Supply chain segment	*%*	*% of retail price*	*%*	*%*
Dairy farms	100	44.2	44.9	
Transportation		0.7		
Upstate Dairy Processor	100	41.0	41.0	
Madison County Store3	100	14.1	14.1	
All segments	100	100.0	100.0	**100**
Added-value contained in Region				**100**

[1] This column contains the % of retail price from Table 4 above. Dairy farms' value-added activity includes transportation from farm to processor.
[2] This column captures all regional activity in the Northeast within the supply chain.
[3] By default, the retailer percent is 100%.
Note: Shaded rows indicate that supply chain member is located in the Northeast.
Source: Author's calculations based on case interviews.

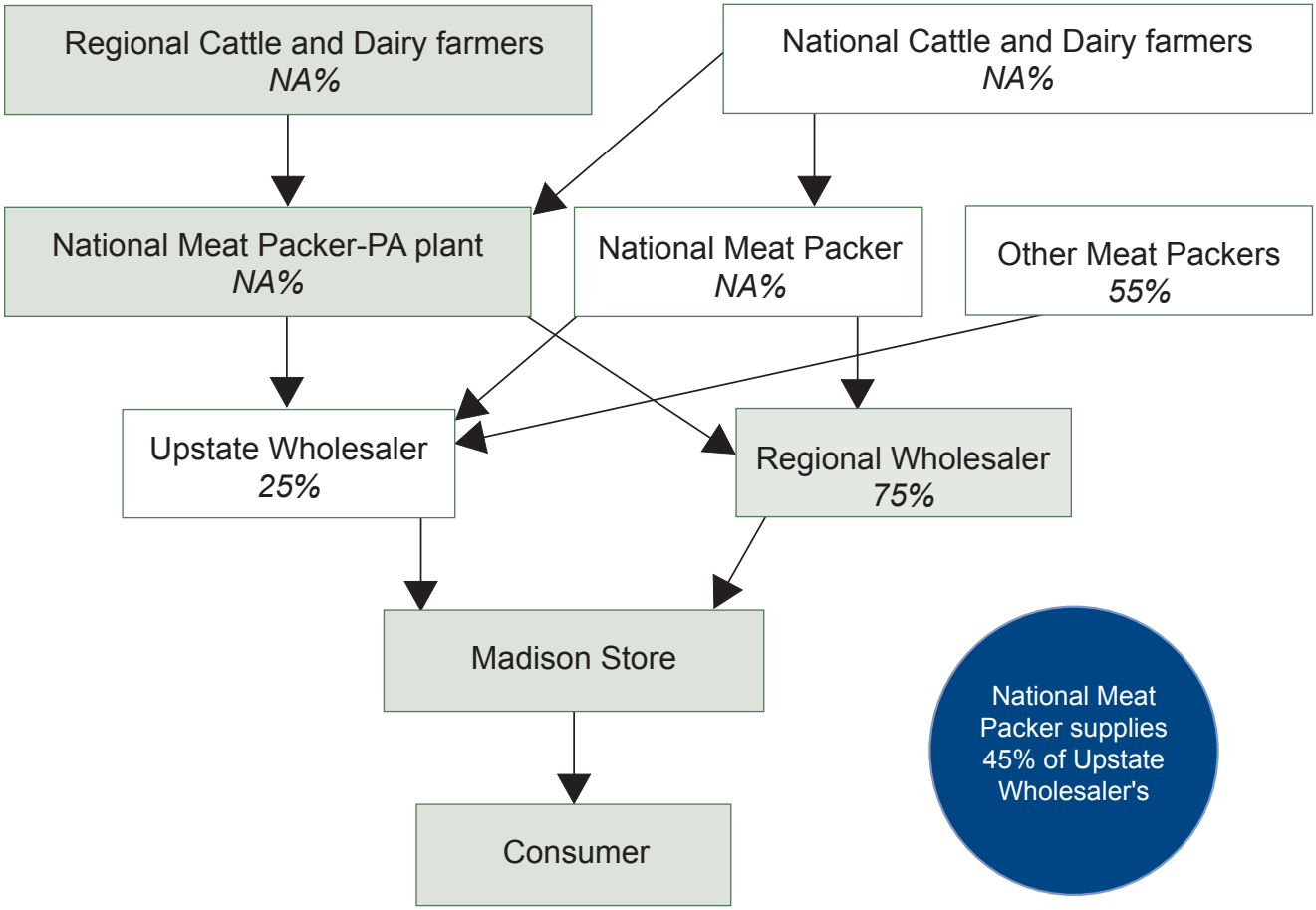
"Only a small portion of the ground beef sourced by Madison Store comes from the Northeast region."

Product 2: Ground Beef

Only a small portion of the ground beef sourced by Madison Store comes from the Northeast region. This reflects the economies of scale within the beef processing industry, which is highly concentrated in the Midwest.

Figure 2 is a depiction of the beef supply chain for the store. Starting at the store and tracing back the supply chain, the boxes upstream indicate the percent of the downstream member's total purchases. Madison Store buys about 75 percent of its beef from Regional Wholesaler. It has been sourcing from them for about 2.5 years. It buys the other 25 percent of its beef as boxed beef from Upstate Wholesalers and has been sourcing from the wholesaler for 21 years. Both of these suppliers purchase their beef from the national beef supply chain.

FIGURE 2: Beef Supply Chain for Madison Store



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.

Upstate Wholesaler

Upstate Wholesaler has been in business for 35 years and specializes in fresh/frozen seafood. It is located in Syracuse, NY about 30 miles from Madison Store. It also sells fresh boxed beef and other meat. Its beef suppliers are primarily the leading U.S. meat packers. Madison Store has a 26 percent gross margin on beef from Upstate. The store places its orders by phone. Payment is expected within 10 days. The store has about a six percent in-store loss each week.

> “...the store has its own butcher and prefers to grind its own ground beef.”

Regional Wholesaler

Regional Wholesaler has been in business almost 100 years. It is a general-line grocery wholesaler carrying almost every product that would be found in a grocery store. It has 15,000 employees in 11 states and almost $2 billion in annual sales.

The store buys beef from Regional Wholesaler some of which it then uses to grind its own ground beef. Although the wholesaler does carry ground beef in tubes as fine or coarse ground as well as in pre-pack patties, the store has its own butcher and prefers to grind its own ground beef.

All of Regional Wholesaler's beef is purchased from plants in Pennsylvania, Michigan, and Nebraska. In turn, 40 percent of the wholesaler's beef is sold to the Northeast, and 60 percent is sold to the rest of the U.S.

National Beef Packer

Regional Wholesaler purchases 45 percent of its beef from National Beef Packer and has done so for over 20 years. Orders with National Beef Packer are placed daily via all modes of communication, phone, online, and automatic replenishment. It takes two days from the time the order is placed to when the product arrives. The average order is for 30,000 pounds and it is delivered by a semi-truck. Delivery charge is separate and the average cost from this supplier the previous year was $0.10 per pound.

Prices are established through negotiations and market prices. The parties have a contract which establishes yearly programs and service levels. Rejects are returned to vendor.

National Beef has a plant in Pennsylvania that supplies some of the beef to Regional Wholesaler. This plant takes in cattle finished in the region as well as outside the region. About 70 percent of the cattle slaughtered at the Pennsylvania plant are finished cattle, and 30 percent are dairy culls or steers. Some cattle farms in the Northeast do send cattle to the plant, so we can say that a regional supply chain for ground beef exists for Madison Store. It is likely that regional dairy producers send their culls to the plant as well.

Regional Comparisons

In this section we examine the structure of the beef supply chain. Unfortunately, not enough information could be gathered about the cattle production stage to compare regional and non-regional supply chains.

Table 7 shows the price margin received by each member of the national supply chain. To estimate the beef packer price for beef ground in-store by Madison Store, we use the USDA, Agricultural Market News price for primal muscle - chuck (choice

grade). The table shows the percent of the retail price received by each member, calculated from the member's price margin. For example, the beef slaughtering plant and packer member in the supply chain is National Beef Packer. Its price margin for one pound of 75 percent ground beef is 47 percent. This margin pays for the cost of goods sold, in this case the cattle supplying the feedlot and/or plant, and all additional slaughtering and value-added expenses. The price margin for Madison Store in the same supply chain is 36.1 percent. 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 different businesses have different cost structures. In this case, the store has a butcher who grinds whole cuts into ground beef in-store which is an additional product labor cost.

TABLE 7: Allocation of Retail Price in Madison Store Ground Beef Supply Chain

Supply chain segment	Price margin ($/lb)	% of retail price
National Beef Packer	1.641	47.0
Transportation	0.10	2.9
Regional Wholesaler	0.46	13.2
Transportation	0.03	0.8
Madison County Store	1.26	36.1
Total Retail Price	3.492	100.0

[1] USDA, AMS Market News Service, Custom Reports, Livestock, Poultry, and Grain Market News Portal, 2016 average.
[2] Store price data 2017
Source: Author's calculations based on case interviews and USDA, AMS Market News Service

Table 8 presents estimates of the distance and fuel used to get beef from the processor to the retailer in two different supply chains. One Pennsylvania cattle farm is an example of a regional supply chain from regional growers selling to Madison Store. In the non-regional supply chain, transportation mileage from National Beef Packer to the Regional Wholesaler distribution center was averaged across the mileage from the two remaining processing plants in Michigan, and Nebraska.

We note that the mileage and fuel estimates for the regional chain contain the cattle producer while those for the non-regional chain do not contain a producer. We can compare the miles and fuel use, however, from each packinghouse to Regional Wholesaler to Madison Store. Fuel use from the Pennsylvania plant to the store is 0.21 gallons per hundredweight, roughly half that from the average of the Michigan and Nebraska plants to the store (0.40 gallons per hundredweight)

TABLE 8: Food Miles and Fuel Use in Madison Store's Ground Beef Supply Chain

	Food miles	Truck miles[1]	Truck capacity	Fuel use[2]	Fuel use per cwt shipped
Supply chain segment	*number*		*cwt*	*gallons*	
Regional: Pennsylvania farm to Madison Store					
Pennsylvania farm to National Meat Packer-PA plant	90	180	200[3]	30.0	0.15
Meat packing plants to Regional Wholesaler	243	243	400	40.5	0.10
Regional Wholesaler to Madison Store	270	270	400	45.0	0.11
All segments	603	693		115.5	0.36
Segments from plant to store only[5]	513	513		85.5	0.21
Non-Regional: National Meat Packer-MI & NB plant average to Madison Store					
Farms to National Meat Packer-MI & NB plants	NA	NA	NA	NA	NA
National Meat Packer-MI & NB plant average to Regional Wholesaler	700[4]	700	400	116.7	0.29
Regional Wholesaler to Madison Store	270	270	400	45.0	0.11
Segments from plant to store only	970	970		161.7	0.40

[1] Truck miles are equal to food miles when beef travels over 150 miles. Trucks on trips longer than 150 miles will return with a backhaul.
[2] Miles per gallon (mpg) for trailer trucks used for shipping beef from the processing plant to the distribution center have a capacity of 40,000 pounds and obtain 6 mpg
[3] We assume trucks hauling live cattle from farm to plant to average 20,000 pounds loaded.
[4] Miles averaged from two remaining plants from which the beef is sourced from National Beef Packer.
[5] May not sum to total due to rounding
NA=Not available.
Source: Author's calculations based on case interviews and USDA, Agricultural Marketing Service.

Prospects for Expansion of Regional Food System: Ground Beef

Most of the value-added activities for ground beef in this case are in the meat packing plant stage and the retail stage where the meat is ground in the store and retailed. We define a regional supply chain as one where the product is produced, or grown, in the region. Although we know that a number of regional beef farms sell finished cattle to the Pennsylvania plant, and a regional supply chain does exist starting with these cattle producers in the Northeast, unfortunately, not enough information could be gathered about the cattle production stage to estimate their price margins. We also cannot say how much of the total supply comes from the regional chain.

While not enough information is known about the cattle production or about the value-added activity (price margin) from the Pennsylvania plant versus the other plants, we do know that all value-added activity at the wholesaling and retailing stages is conducted in the region.

To calculate the extent of regional value-added in the supply chain provided by wholesaling and retailing, we use supply chain members' retail price margins from Table 7 as proxies for value-added, and we weight these by how much product the chain provides to the store (see Figure 2). Table 9 summarizes the extent of members' participation in the supply chain.

The supply chain stream starts with beef processed in Pennsylvania, Michigan, and Nebraska. This stream includes activities from the packing plants, from the grocery wholesaler, and from Madison Store retailer.

The sum of the regional activities that are provided by the grocery wholesaler and the store is 37.6 percent, which is the percent of all value-added activities of this supply chain that are being conducted in the region. The activities are in wholesaling, transportation, and retailing.

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

TABLE 9: Extent of Regional Value-Added Activity in Madison Store's Ground Beef Supply Chain

	Value-added retained by supply chain member [1]	Extent of regional value-added activity[2]
Supply chain segment	*% of retail price*	*%*
Finisher cattle farmer	NA	
National Beef Packer	47.0	
Transportation	2.9	
Regional Wholesaler	13.2	9.9
Transportation	0.8	0.6
Madison Store retailer	36.1	27.1
Added-value performed in Region		**37.6**

1 This column contains the % margins of retail price from table 7 above.
2 This column captures all regional activity in the Northeast within this supply chain (excludes supply chain activity outside of the Northeast).
NA=Not available
Note: Shaded rows indicate supply chain members located in the Northeast.
Source: Author's calculations based on case interviews.

> “The store carries all the products larger supermarkets do, including meats, produce, and groceries, but its small size and rural location hamper its ability to leverage economies of scale.”

Key Lessons for Madison Store

Madison Store is a small, independent supermarket located in a rural area of Upstate New York. It purchases most of its supplies from Regional Wholesaler but also purchases from other suppliers. The product supply chains described in this case are fluid milk and ground beef.

The Store and Its Environment

Effect of size and economies of scale

- Madison Store is a solely owned and operated store with approximately 6,600 square feet of selling area. The store carries all the products that larger supermarkets do, including meats, produce, and groceries, but its small size and rural location hamper its ability to leverage economies of scale. In the most recent interview with the store owner, labor costs remain a major factor in their ability to stay in business. The owners also added lack of a customer base as a major limiting factor. The rural community of 1,745 people located in a rural county in Upstate New York is a small customer base.

Effect of ownership structure on the supply chains

- As an independent store, Madison Store can choose its own suppliers and business partners and sculpt its selection or assortment of products.
- Through trial and error, the owners have experimented with offering an array of products not carried by the wholesaler in order to address some demands for healthier products and in order to meet demands for more local products.
- The store also started a farmers market in a lot adjacent to the store based on feedback received from focus groups. The store felt the exposure was good with few complaints.

Market Basket Supply Chains

Effect of regional production/industry

- The Northeast is able to produce enough fluid milk for consumption in the region. The number of food miles traveled and fuel consumed in getting milk to the store are low, estimated at 136 miles and 0.17 gallons per hundredweight respectively.
    - Transportation costs for perishable products, such as refrigeration, space usage, perishability and time to market, etc., are greater than transporting packaged goods. There is a clear link that the supply chains for milk tend to be geographically closer to the stores than for the packaged goods that were included in the study.

  - The milk sold by the store is produced and processed in the region and sold directly to the store by the processor, while the ground beef is sold through an intermediary, Regional Wholesaler. We hear from the store owners that they purchase directly from other processors that are local, for example sausages and bread. The burden of sourcing and transporting the local products lies with the store owners.
- Milk is labeled by the city in which the packing plant is located, although this labeling is in small print and not prominently displayed. Ground beef is not labeled with a source identification, and a source identification will not likely benefit the national beef packer.

Extent of regional value-added activity

- The regional value-added activity for milk sold by Madison Store is 100 percent.
- The regional wholesaling and retailing value-added activity for the ground beef sold by the store is estimated as 37.6 percent. Although some of the beef is grown, slaughtered and cut inside the region, we did not have enough data to calculate the complete regional contribution to value-added.
  - o We see that even for supply chains originating outside the region, a lot of value-addition is conducted in the Northeast. This is important because this translates into economic activity from the distribution and retailing systems which occur in the Northeast.

Effect of geography/distance

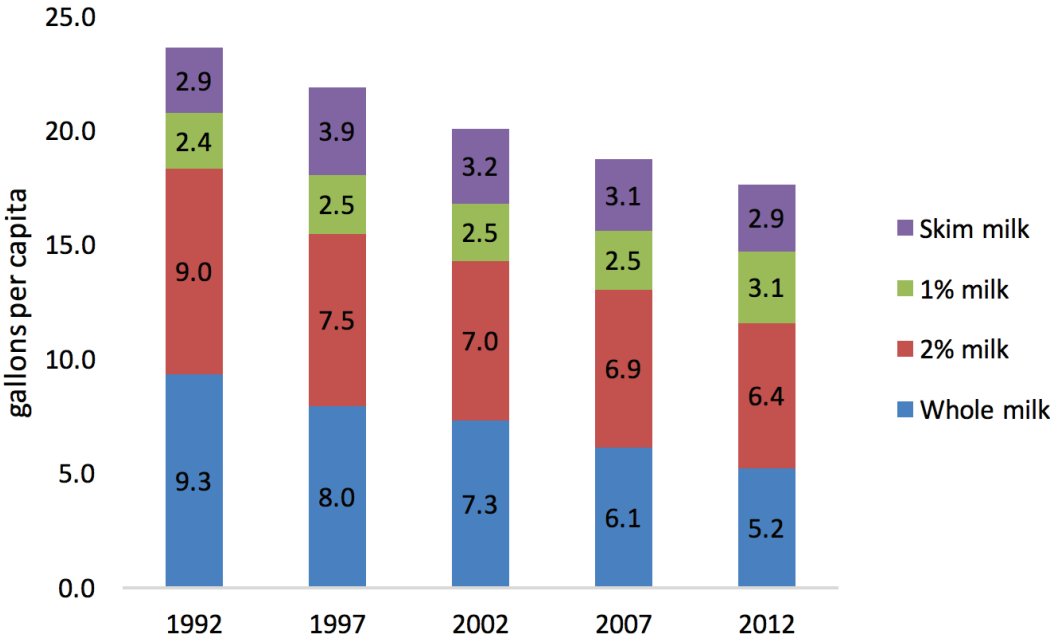
- The fuel use for beverage milk is 0.17 gallons per hundredweight. The fuel use for beef cannot be as easily estimated; however, fuel use from the Pennsylvania plant to the store is 0.21 and from the average of the other two plants (in Michigan and Nebraska) is 0.40 miles per gallon.
  - The biggest 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.

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.[6] 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.).

[6] Mintel, 2014. *Milk, Creamers and Non-Dairy Milk - US - April 2014.*

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

	Percent of dairy department
Supermarket Dairy Department *(9.0% of supermarket sales)*	
Milk	26.5
Cheese	25.8
Yogurt	11.5
Juices, Drinks-Refrigerated	9.3
All other[1]	26.8

[1] 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

State	Production	Value of production
	million lbs	*$ million*
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.[7]

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.
1	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, *million lbs.*	201,218	29,480	14.7
1	Value of milk production, *$*	40,477,414	6,299,328	15.6
1	Milk per cow, *lbs.*	21,822	20,692	94.8
1	Milk farm price, *$/cwt*	20.1	21.4	106.5
2	Retail price, whole, *per gallon*	3.46	NA	NA
3	Per capita consumption, plain milk, *gallons*[1]	17.5	NA	NA

[1] Plain milk includes all fluid, unflavored milk, including whole, 1%, 2%, and skim milk.

Sources:

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

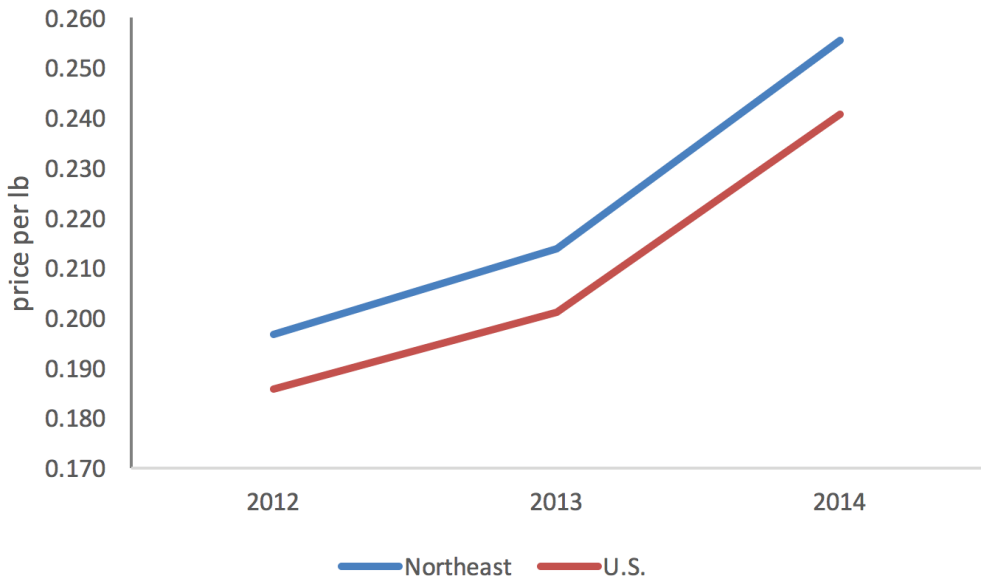
2 Bureau of Labor Statistics, Consumer Price Index-Average Price Database. http://www.bls.gov/cpi/.

3 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.

[7] 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.

FIGURE A.2: Milk Price Received, Price per Pound 2012 – 20141



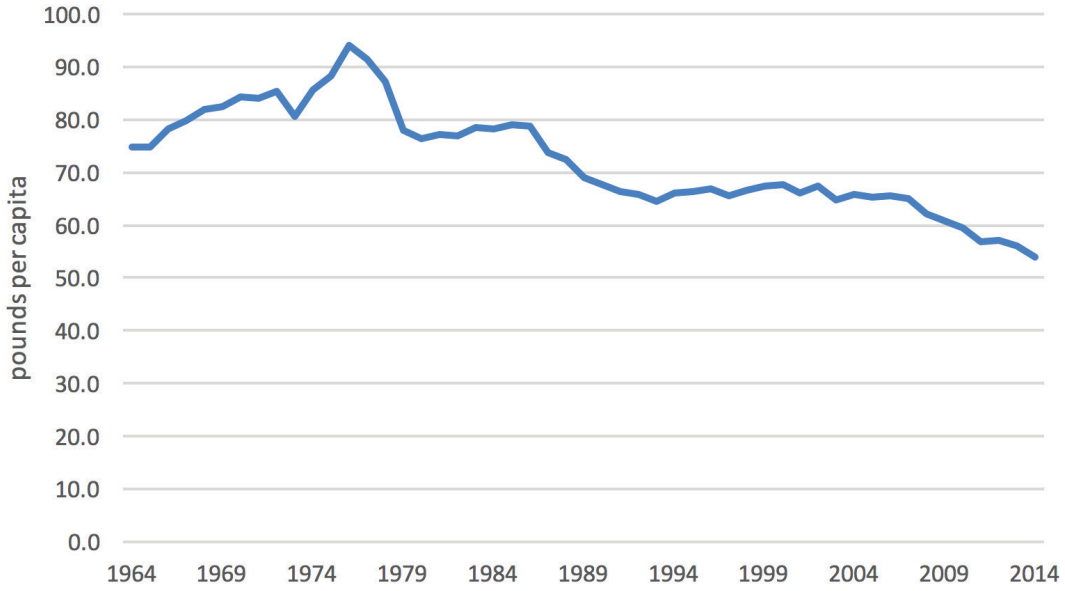
[1] Before deductions for items such as hauling and stop charges, advertising and promotion costs, and coop dues. It does not include hauling subsidies, but does include premiums and discounts for quality, quantity, or other reasons.

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

Ground Beef Industry Profile

Per capita consumption of all beef has been declining since its highest levels in the mid-1970s (Figure A.3). The United States Department of Agriculture Economic Research Service (USDA-ERS) estimates that in 2014, after estimating retail weights from carcass weights, estimated per capita beef consumption[8] was 53.9 pounds. In 1976, per capita consumption was 94.1 pounds.

FIGURE A.3: Per Capita Availability of Beef, Retail Weight



Source: USDA, ERS, *Food Availability (per capita)* Data System. data set Red meat (beef, veal, pork, lamb, and mutton). https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/food-availability-per-capita-data-system/#Food%20Availability

Using data from the Beef Checkoff, Rabobank estimated ground beef consumption in 2012 to be 57 percent of all beef consumption.[9] This is an increase from the estimate of 50 percent by Davis and Lin (2005).[10]

By applying this estimate of ground beef usage to the per capita beef availability in 2014, ground beef consumption in 2014 can be estimated as 30.7 pounds per capita.

Ground beef has been gaining in popularity. One reason may be due to increasing beef prices. According to the Bureau of Labor Statistics' retail price reports, overall retail prices for beef have been increasing since the 2008 recession and increased more sharply in 2014. To help compensate, consumers have been shifting purchases from more expensive cuts to less expensive ground beef.

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[8] Food availability estimates measure food supplies moving from production through marketing channels for domestic consumption. This data series provides estimates of per capita availability for hundreds of commodities. The food availability data series is a popular proxy for actual food consumption.-USDA, ERS. https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/food-availability-documentation/

[9] "Ground Beef Nation: The Effect of Changing Consumer Tastes and Preferences on the U.S. Cattle Industry" Rabobank AgFocus, January 2014. Sourced from: https://web.extension.illinois.edu/oardc/downloads/52548.pdf

[10] Davis, Christopher G. and Lin, Biing-Hwan. *Factors Affecting U.S. Beef Consumption*. LDP-M-135-02. U.S. Department of Agriculture, Economic Research Service, October 2005. http://usda.mannlib.cornell.edu/usda/ers/LDP-M/2000s/2005/LDP-M-10-07-2005_Special_Report.pdf

A second reason for ground beef's growing popularity may be due to shifts in consumer interest. Ground beef has gained status and is being featured on many restaurant menus, which have embellished the hamburger and given it style and distinction.[11] In addition, ground beef is very convenient, able to be prepared quickly and used in a variety of ways and also requiring fewer cooking skills.

The changes in prices and demands for certain cuts have led many in the beef industry to believe that the industry structure, management, and price incentives need to change soon in order to compete with other, less expensive meat options, such as chicken and pork.[12]

Production

The majority of ground beef comes from beef cattle. Ground beef can also come from dairy cattle, including culled cows and bulls along with feeder dairy steer.

The beef cattle industry is concentrated in the Midwest and Plains regions of the U.S. Cow herds range between the Mississippi and the Rockies, and feeder cattle feedlots are concentrated in the Southern and parts of the Northern Plains. These areas are conducive the feeding needs for each segment of the cattle industry as it is more costly to ship feed than it is to ship cattle.[13]

The dairy industry, however, is concentrated in the Lake States, West, and Northeast. This is due to a combination of factors, including the high cost of shipping fluid milk as well as the cost of shipping feed.

According to the USDA, 40 percent of the feeder cattle are fed and marketed from large feedlots with a capacity of 32,000 head or more. As the trend toward larger and fewer feedlots continues, the beef industry is also shifting toward vertically integrating from cow-calf and feedlot operations to processing operations.[14]

Estimates of the amount of ground beef derived from each class of cattle slaughtered are displayed in Table A.4 for the top five production states and the Northeast. According to the National Agricultural Statistics Service (NASS), the two leading ground beef production states are Texas and Nebraska. The Northeast

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[11] Herbert, David Gauvey, 2015. "What the hell has happened to the price of ground beef?" Quartz, July 2, 2015. http://qz.com/442037/what-the-hell-has-happened-to-the-price-of-ground-beef/

[12] Rabobank, 2014

[13] Shields, Dennis A. and Kenneth H. Mathews, Jr. (2003) *Interstate Livestock Movement.* USDA, ERS, LDP-M-108-01. June 2003.

does not contain any of the top five states, and only a few states in the Northeast have large-scale cattle slaughter plants. The Northeast does produce ground beef from the dairy industry, and Pennsylvania slaughters the most cattle within the Northeast.

TABLE A.4: 2010 Ground Beef Production by Class of Cattle

	Class of cattle						
	Steers	Heifers	Dairy Cows	Other Cows	Bulls	Farm Slaughter	Total
	1,000 pounds						
Top 5 states	1,075,440	726,233	344,249	165,211	24,332	2,957	2,338,422
Northeast[1]	35,963	8,389	180,546	8,845	2,264	2,053	238,060

[1] Data includes Virginia which is not in the study region for the Northeast.
Source: Cornell estimates from USDA, NASS, Cattle Inventory 2010 data

U.S. Beef Packers

Beef and dairy cattle are sent to beef packers where they are slaughtered and cut up. The Cattle Buyer's Weekly estimated that in 2015 the top four beef packers accounted for about 75 percent of the total pounds of beef slaughtered in the U.S.

The largest packer, Tyson, buys its cattle from independent feeders and ranchers who supply its beef plants in the Midwest, South and Pacific Northwest rather than owning or operating its own feedlots.[15]

However, some beef packers are vertically integrated and operate their own feedlots. For example, JBS, the number two leading beef packer, also owns the leading feedlot company JBS Five Rivers. Cargill, the number three leading packer, owns the fourth largest feedlot Cargill Cattle Feeders.[16]

Retail Sales

On average, ground beef sales were estimated to be 39.6 percent of all beef sales and approximately 17 percent of all meat department sales (Table A.5.). This is more than any individual cut of meat in the department. Retailers usually make their own ground beef from whole muscle parts and trimmings from other meats. The normal cuts used for this are sub-primal cuts such as the knuckle, eye round, and chuck. Some stores may take trimmings and ends

[15] Built for Growth (Tyson, Investor presentation) http://s1.q4cdn.com/900108309/files/doc_presentations/2015/TSN-Investor-Presentation-December-2015.pdf

[16] "2015 CattleFax Section." National Cattlemen's Beef Association. 2015. http://www.beefusa.org/CMDocs/BeefUSA/Producer%20Ed/2015%20CattleFax%20section.pdf

from roasts and other cuts and grind them. Retailers can also buy large tubes of beef already ground, usually 10-pound tubes, to regrind in the store and package according to their needs.

TABLE A.5: Ground Beef Retail Sales

Product	2011 Average sales per store (52 weeks ending 2/25/12)	% of beef sales
Ground beef	$6,786	39.6

"Fresh beef: more than one-third of U.S. shoppers choose beef over the other proteins at the fresh meat counter." *Grocery Headquarters* June 2012: 90. *Business Insights: Essentials.* Web. 24 Oct. 2013.

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