

January 2007

GIPSA Livestock and Meat Marketing Study

Contract No. 53-32KW-4-028

Volume 6: Meat Distribution and Sales Final Report

Prepared for

Grain Inspection, Packers and Stockyard Administration
U.S. Department of Agriculture
Washington, DC 20250

Prepared by

RTI International
Health, Social, and Economics Research
Research Triangle Park, NC 27709

RTI Project Number 0209230



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RTI International is a trade name of Research Triangle Institute.

Abstract

Over time, the variety, complexity, and use of alternative marketing arrangements (AMAs) have increased in the livestock and meat industries. Marketing arrangements refer to the methods by which livestock and meat are transferred through successive stages of production and marketing. Increased use of AMAs raises a number of questions about their effects on economic efficiency and on the distribution of the benefits and costs of livestock and meat production and consumption between producers and consumers. This volume of the final report focuses on AMAs used in meat distribution and sales and addresses the following parts of the Grain Inspection, Packers and Stockyards Administration (GIPSA) Livestock and Meat Marketing Study:

- Part C. Determine extent of use, analyze price differences, and analyze short-run market price effects of AMAs.
- Part D. Measure and compare costs and benefits associated with spot marketing arrangements and AMAs.
- Part E. Analyze the implications of AMAs for the livestock and meat marketing system.

This final report follows the publication of an interim report for the study that used qualitative sources of information to identify and classify AMAs and to describe their terms, availability, and reasons for use. The portion of the study contained in this volume of the final report is based on analyses using industry survey data from meat processors, wholesalers, retailers, and food service operators and transactions data from meat processors.

This volume of the final report presents the results of analyses of the effects of AMAs on meat distribution and sales beyond the packing plant. The analyses are primarily descriptive and use a format different from the species-specific analyses

presented in previous volumes. Both beef and pork purchases and sales are examined. Because of the nature of the data maintained in the industry, we cannot identify a specific link between the use of specific AMAs for purchase of live animals and products bought and sold by meat processors.

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We would like to thank the anonymous peer reviewers and GIPSA staff who provided comments on earlier drafts, which helped us improve the report. We also thank Sharon Barrell and Melissa Fisch for editing assistance.

This report and the study on which it is based were completed under a contract with GIPSA, U.S. Department of Agriculture (USDA). Any opinions, findings, and conclusions or recommendations expressed in this report are those of the authors and do not necessarily reflect the views of GIPSA or USDA.

Contents

Section	Page
Abstract	iii
Executive Summary	ES-1
1 Introduction and Background	1-1
1.1 Overview of Meat Distribution and Sales	1-2
1.1.1 Comparisons of Consumption and Retail Prices for Beef, Pork, Lamb, and Poultry	1-4
1.1.2 Changes in Patterns of Meat Sales by Food Service Operators and Retailers.....	1-9
1.2 Overview of Marketing Arrangements in Meat Distribution	1-14
1.3 Description of the Meat Processor Transactions Data.....	1-15
1.3.1 Meat Processor Purchase Transactions Data	1-16
1.3.2 Meat Processor Sales Transactions Data	1-17
1.4 Organization of this Study Volume.....	1-17
2 Volume and Quality Differences Associated with Alternative Marketing Arrangements	2-1
2.1 Meat Distribution Volumes by Type of Marketing Arrangement	2-1
2.1.1 Summary of Downstream Survey Responses	2-2
2.1.2 Summary of Meat Processor Transactions Data.....	2-4
2.2 Quality Differences Associated with Marketing Arrangements in the Beef Industry	2-15
2.3 Summary.....	2-21
3 References	3-1

Figures

Number		Page
1-1	General Overview of Meat Product Flows	1-3
1-2	U.S. Quarterly Per Capita Beef Consumption (lbs per person) and Real Retail Beef Price (\$/lb) (2004 dollars), 1964–2004	1-5
1-3	U.S. Quarterly Per Capita Pork Consumption (lbs per person) and Real Retail Pork Price (\$/lb) (2004 dollars), 1964–2004	1-6
1-4	U.S. Quarterly Retail Beef, Pork, Lamb, and Poultry Prices (2004 dollars), 1964–2004	1-8
1-5	U.S. Quarterly Per Capita Beef, Pork, and Poultry Consumption (lbs per person), 1964–2004	1-9
1-6	Expenditures for Food at Home and Food Away from Home, 1960–2002	1-11
1-7	Four-Firm Concentration Ratios (CR4s) for Grocery Retailers, 1987–2001	1-13

Tables

Number		Page
2-1	Summary of Available Data on Purchase of Meat Products by Processors, October 2002–March 2005	2-4
2-2	Summary Statistics for Meat Purchase Lot Characteristics, October 2002–March 2005	2-5
2-3	Summary of Meat Purchase Methods by Meat Type, October 2002–March 2005	2-7
2-4	Summary of Meat Purchase Pricing Methods by Meat Type, October 2002–March 2005	2-7
2-5	Summary of Types of Formula Bases Used for Meat Purchases by Meat Type, October 2002–March 2005	2-8
2-6	Meat Branding by Purchase Method, October 2002–March 2005	2-9
2-7	Type of Alternative Marketing Arrangements Used for Meat Purchases by Meat Processors, by Level of Processing, October 2002–March 2005	2-10
2-8	Summary of Available Data on Sales of Meat Products by Processors, October 2002–March 2005	2-11
2-9	Summary Statistics for Meat Sales Characteristics, October 2002–March 2005	2-12
2-10	Fed Cattle Purchase Transactions Based on Beef Product Branding Categories, October 2002–March 2005	2-16
2-11	Beef Sales Product Branding, by Type of Cattle Purchase Method (No. of Plants = 24), October 2002–March 2005	2-17
2-12	Fed Cattle Purchase Transactions Based on Sales Transactions Categories, October 2002–March 2005	2-18
2-13	Use of AMAs for Cattle Purchases Based on Use of Marketing Arrangements for Beef Sales (No. of Plants = 24), October 2002–March 2005	2-19

Executive Summary

As part of the congressionally mandated Livestock and Meat Marketing Study, this volume of the final report presents the results of analyses of the effects of alternative marketing arrangements (AMAs) on the distribution and sales of meat products downstream from the packer. This volume focuses on determining the extent of use of AMAs, describing the linkages between the stages of meat production, and describing the relationship between the use of AMAs and meat quality.

In this report, AMAs refer to all possible alternatives to the cash or spot market. AMAs in meat distribution and sales include arrangements such as forward contracts and marketing agreements. Cash or spot market transactions refer to transactions that occur immediately, or “on the spot.” These include sales through dealers and brokers and direct trades.

The analyses include both beef and pork products, are descriptive, and focus on the relationships among industry participants involved in distributing meat products beyond the packing plant. The information used for this volume includes the results of the industry interviews, data from the industry surveys (described in Volume 2), and transactions data from meat processors. Analyses conducted for the Livestock and Meat Marketing Study are limited to economic factors associated with spot market and AMAs and do not analyze policy options or make policy recommendations.

Primary conclusions for this final report, as they relate to meat processing, distribution, and sales,¹ are as follows:

¹ Note that meat processors conduct meat processing but do not slaughter livestock. Meat packers slaughter livestock and may or may not conduct meat processing.

- **Meat processors differ greatly in the products they purchase and the products they sell.** Individual firms may have a dominant practice for purchases, sales, and pricing that is different from other competing firms. Although some processors' transactions data did reflect a mix of purchasing and/or pricing methods, many were all of one method. This dominant method approach was apparent in comparing the survey data with the transactions data. The survey includes more small firms, while the transactions data represent larger firms. Sixty-three percent of the processors surveyed indicated that they used the spot market exclusively. From the transactions records representing larger firms, 25% of records and 21% of the volume by weight for both beef and pork processors were in the spot market. Thus, based on the difference in the sample of processors that provided transactions data compared with those that responded to the survey, the results of the analysis differ.
- **Meat processors surveyed relied heavily on the spot market for meat purchases and sales but also used other methods.** An estimated 91% of the plants surveyed used the spot market for purchases, and 63% used it exclusively. Forward contracting was used by nearly 20% of plants, and marketing agreements and internal company transfers each were used by approximately 13% of the plants. The two most common pricing methods for purchases were price lists and individually negotiated prices (approximately 60% each). Formula pricing, typically tied to USDA-reported prices, was used by 32% of plants and 13% of plants used internal transfer. Approximately 60% of plants surveyed used the cash or spot market for meat sales as well. Forward contracts, marketing agreements, and internal transfers were approximately 10% each.
- **Transactions data indicate that meat processors often bought processed products and sold more highly processed products.** Transactions purchase data were 73% pork and 27% beef, by weight. Pork processors' purchase records were primarily for subprimal cuts (31%), ready-to-eat (RTE) product (24%), and ground pork and trimmings (19%). In contrast, beef processors' purchase transactions were primarily for processed RTE product (39%) and ground beef and trimmings (22%). The processors reporting sales produced only two product types—case ready and processed RTE.

- **Transactions data on meat processor purchases indicate a much larger use of AMAs than do the survey data.** Based on transactions data, only 21% of beef and pork products were purchased on the spot market. Internal transfers were a large factor for pork but were virtually nonexistent for beef. Forward contracts were 28% of beef purchases, but less than 1% of pork purchases. The type of purchase method used is either not important to meat processors or they did not understand the meaning of the categories, because 39% of beef and 32% of pork purchase methods were listed as “other or missing.”
- **Approximately 99% of pork and 55% of beef product pounds that were priced using formula pricing used a USDA-reported price as the base.** The other base used for purchased beef was a subscription service. Although nearly all pork pricing formulas are based on USDA-reported prices, it is worth noting that wholesale pork, while reported by USDA, is not covered under Mandatory Price Reporting (MPR).
- **Meat processors play an important distribution role in the meat value chain by purchasing large lots from a few sources and selling small lots to many firms.** Transaction purchase data included 53,831 records from 32 firms, averaging 22,800 pounds per transaction. Sales transactions from 11 firms included 848,295 records, averaging 771 pounds per transaction, and these were all case ready or RTE. A high percentage of these transactions did not identify the sales method, indicating that processors either did not understand the meaning of the categories that were listed or do not track this information.
- **When examining data specific to the beef industry, aggregate cattle purchase and beef sales transactions data suggest no relationship between cattle purchase methods and branded beef sales, although this relationship may be important to individual firms.** Plants that sold 0% to 20% of their beef as branded product purchased approximately the same percentage of their cattle on the spot market as did plants that sold 21% to 40% of their beef as branded product. Although the differences were small, the 21% to 40% plants used more forward contracts and less packer ownership than did the 0% to 20% plants. Shares of marketing agreement cattle were nearly identical across the two groups. In addition, 60% of the meat purchased on the spot market by processors

was branded product compared with none through marketing agreements and internal transfers.

- **Although potentially important to some beef industry firms, aggregate transactions data suggest that downstream marketing arrangements have no relationship to cattle purchase methods.** Beef plants were divided into two groups based on beef sales methods—0% to 50% and 51% to 100% cash or spot market beef sales. Transactions from both groups indicated that they each bought 60% of their cattle through the spot market and 40% using AMAs. The 0% to 50% cash sales group used more marketing agreements, and the 51% to 100% cash sales group had more packer-owned cattle.
- **Aggregate transactions data for the beef industry suggest some relationship between meat buyer type and cattle purchase methods.** Packers that sold more beef to meat processors bought fewer cattle on the spot market but about the same number of cattle through AMAs (with the difference resulting from a larger percentage of other purchases or missing information). Packers that sold a larger amount of beef to retailers and food service operators bought a larger percentage of their cattle on the spot market and a slightly lower percentage of cattle through AMAs.
- **The pork industry is more vertically integrated than is the beef industry.** Pork packers produce a higher percentage of the animals that they slaughter than do beef packers, and pork processors acquire much more of their product through internal transfer than do beef processors.
- **Meat processor buyers mix and match purchase and pricing methods.** Formula pricing was used as the pricing method for spot market, forward contracts, and marketing agreements. Likewise, individually negotiated prices were more common in forward contracts than in spot markets.

Decisions regarding methodologies, assumptions, and data sources used for the study had to be made in a short period of time. The analyses presented in this volume are based on the best available data, using methodologies developed to address the study requirements under the time constraints of the study. However, some analyses were limited because of the availability and quality of the transactions data.

1

Introduction and Background

Alternative marketing arrangements include all possible alternatives to the use of cash or spot markets for conducting transactions.

As part of the congressionally mandated Livestock and Meat Marketing Study, this volume of the final report presents the results of analyses of the effects of alternative marketing arrangements (AMAs) on meat distribution and sales. The types of questions posed by the Livestock and Meat Marketing Study include the following: What types of marketing arrangements are used? What is the extent of their use? Why do firms enter into the various arrangements? What are the terms and characteristics of these arrangements? What are the effects and implications of the arrangements on participants and on the livestock and meat marketing system?

The overall study comprises five parts based on the performance work statement in the contract with the Grain Inspection, Packers and Stockyards Administration (GIPSA). An interim report released in August 2005 addressed the first two parts, Parts A and B, of the study (Muth et al., 2005). It described marketing arrangements used in the livestock and meat industries and defined key terminology.¹ Results presented in the interim report were preliminary because they were based on assessments of the livestock and meat industries using published data, review of the relevant literature, and industry interviews.

This volume of the final report for meat processing, distribution, and sales uses a different format than the one used for each of the species because of differences in data availability and the

¹ A glossary of terms used in the study is included in a separate document.

The interim report released in August 2005 addressed the first two parts of the study. This final report focuses on the final three parts of the study (Parts C, D, and E).

nature of the research questions.² The analyses conducted for the species-specific volumes address Parts C, D, and E of the study as follows:

- Part C. Determine extent of use, analyze price differences, and analyze short-run market price effects of AMAs.
- Part D. Measure and compare costs and benefits associated with spot and AMAs.
- Part E. Analyze the implications of AMAs for the livestock and meat marketing system.

The analyses in this volume, which include both beef and pork products, are descriptive and focus on the relationships among industry participants involved in distributing meat products beyond the packing plant. Thus, the focus is on the role of AMAs in meat processing, distribution, and sales.

The information used for this volume includes the results of the industry interviews,³ data from the industry surveys (described in Volume 2), and transactions data from meat processors and beef packers. Analyses conducted for the Livestock and Meat Marketing Study are limited to economic factors associated with spot and AMAs and do not analyze policy options or make policy recommendations.

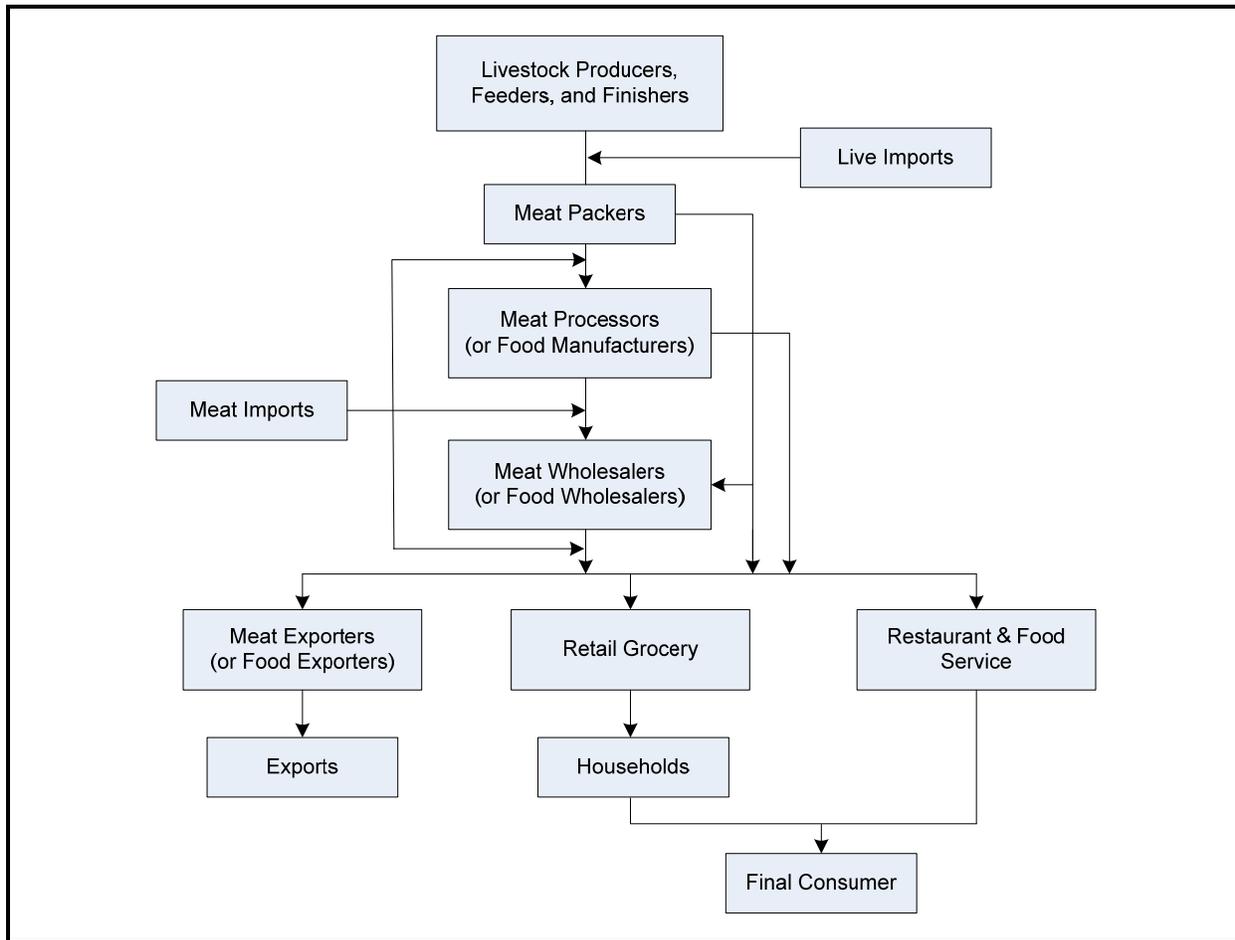
1.1 OVERVIEW OF MEAT DISTRIBUTION AND SALES

As indicated in Figure 1-1, meat distribution and sales occur through several successive stages. Livestock producers, feeders, and finishers sell live animals to meat packers. Some live animals are also imported and shipped directly to meat packing plants for slaughter. From the meat packing plant, carcasses, cuts, and processed meats are either shipped to a meat processor or directly to wholesalers, exporters, grocery retailers, or restaurants/food service operators. Based on the sales transactions data for beef packers and pork packers, approximately 15% of beef packer sales pounds and 21% of pork packer sales pounds are to meat processors and food

² Note that meat processors conduct meat processing but do not slaughter livestock. Packers slaughter livestock and may or may not conduct meat processing.

³ A description of the process for conducting the interviews and the complete findings from the interviews is provided in the interim report (Muth et al., 2005).

Figure 1-1. General Overview of Meat Product Flows



manufacturers. The remainder of sales pounds represents product that has completed processing and is ready for final cooking or preparation before consumption. Meat products shipped to meat processors (or food manufacturers that use meat as an ingredient) for further processing are either shipped to a wholesaler or directly to any of the other types of downstream establishments. Finally, meat wholesalers (or food wholesalers) ship meat products to exporters, retailers, or restaurants/food service operators. In some cases, all of these stages occur at a single establishment that slaughters livestock and sells meat products directly to consumers. At the other extreme, meat products are traded through all of these individual stages. Note that imported meat products enter at various stages depending on the level of processing and intended use of the product.

Over the past several decades, patterns of U.S. meat consumption have been affected by changes in relative prices for meat, consumer income levels, and tastes and preferences for meat and poultry. Changes in beef and pork consumption and prices relative to poultry are discussed below, before discussing changes in the location of meat consumption (e.g., food consumed at home versus away from home).

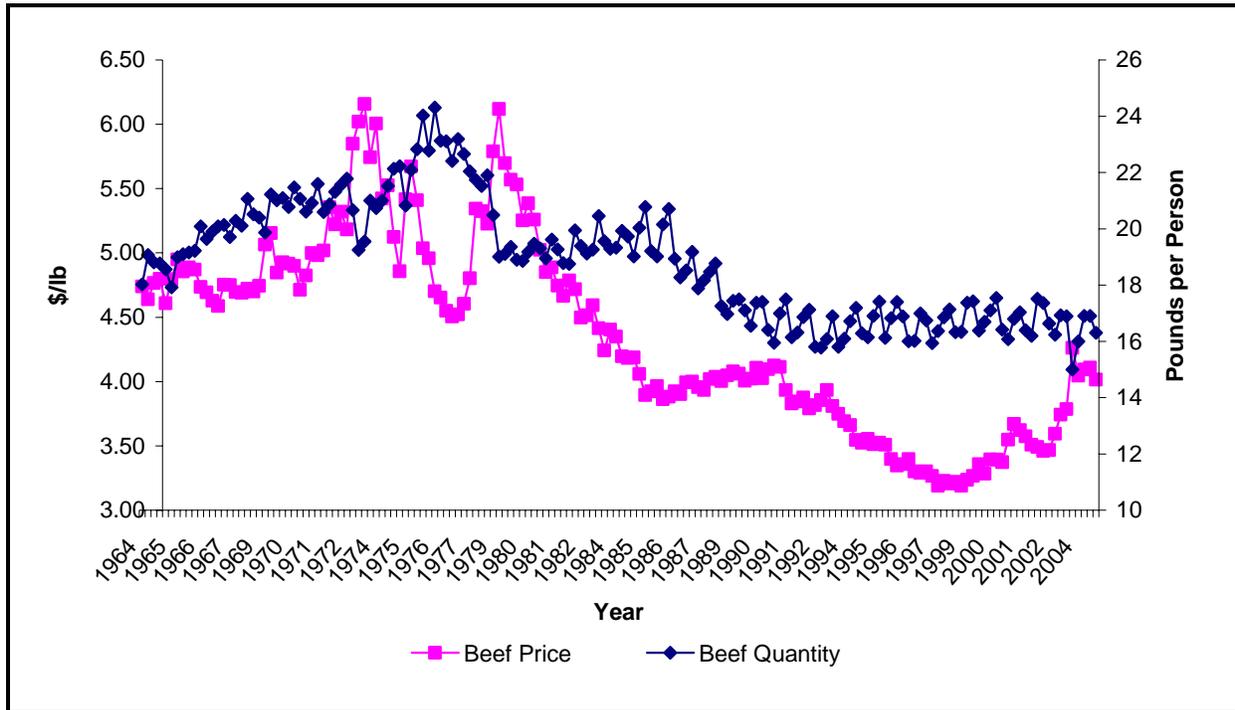
1.1.1 Comparisons of Consumption and Retail Prices for Beef, Pork, Lamb, and Poultry

Figure 1-2 reveals that U.S. beef consumption is quite seasonal—consumption in the second and third quarters is typically higher than consumption in the first and fourth quarters. Over the period 1964 to 2004, per capita beef consumption averaged around 18.8 pounds per quarter (approximately 75.3 pounds per capita annually). Per capita beef consumption levels have also been quite variable over this time period, ranging from as little as 15.0 pounds in the fourth quarter of 2003 to as much as 24.3 pounds in the third quarter of 1976 and have been decreasing generally. U.S. quarterly real retail beef prices measured in 2004 dollars have decreased over the entire period. During the mid- to late-1970s, real retail beef prices exceeded \$6.00 per pound for several quarters, reaching a peak of \$6.16 per pound (in 2004 dollars) in the third quarter of 1973. After this peak, real retail beef prices decreased dramatically for a period of 6 years to a level just below \$4.00 per pound in the mid-1980s. Prices remained steady around this level for a period of approximately 6 additional years before declining significantly again, this time to as low as \$3.20 per pound (in 2004 dollars) in the first quarter of 1999. Since then, real prices have risen and are back above \$4.00 per pound.

Figure 1-2 also shows that the relationship between beef prices and consumption levels weakened between 1964 and 2004, as both real retail prices and per capita consumption trended downward. This inverse relationship was quite strong up to the early 1980s, and then consumption levels appear to have become less responsive to changes in real retail prices. For example, during the price declines from 1992 to 1999, consumption levels remained relatively stable, although still quite seasonal at around 17 pounds per capita per quarter. The seemingly weaker inverse price and quantity relationship appeared to

Figure 1-2. U.S. Quarterly Per Capita Beef Consumption (lbs per person) and Real Retail Beef Price (\$/lb) (2004 dollars), 1964–2004

The inverse relationship between beef prices and beef consumption has weakened over time.



Sources: U.S. Department of Agriculture (USDA), Economic Research Service. 2004g. *Red Meat Yearbook*. Stock #94006. Washington, DC: USDA. <<http://usda.mannlib.cornell.edu/data-sets/livestock/94006/>>.

U.S. Department of Agriculture, Economic Research Service. 1994. "Livestock and Meat Statistics." *Red Meat Yearbook*, Statistical Bulletin No. 885. Washington, DC: USDA.

U.S. Department of Agriculture, Economic Research Service. 2005. *Livestock, Dairy, & Poultry Outlook*. Washington, DC: USDA. <<http://www.ers.usda.gov/publications/ldp/>>.

U.S. Bureau of Labor Statistics. "Consumer Price Index—All Urban Consumers, U.S. All Items." <<http://data.bls.gov/cgi-bin/surveymost?cu>>. Accessed April 18, 2005.

U.S. Department of Commerce, Bureau of Economic Analysis. National Income and Product Accounts Table, Table 2.6 Personal Income and Its Disposition, Monthly. Washington, DC: U.S. Department of Commerce. <<http://www.bea.gov/bea/dn/nipaweb/SelectTable.asp?Selected=N>>.

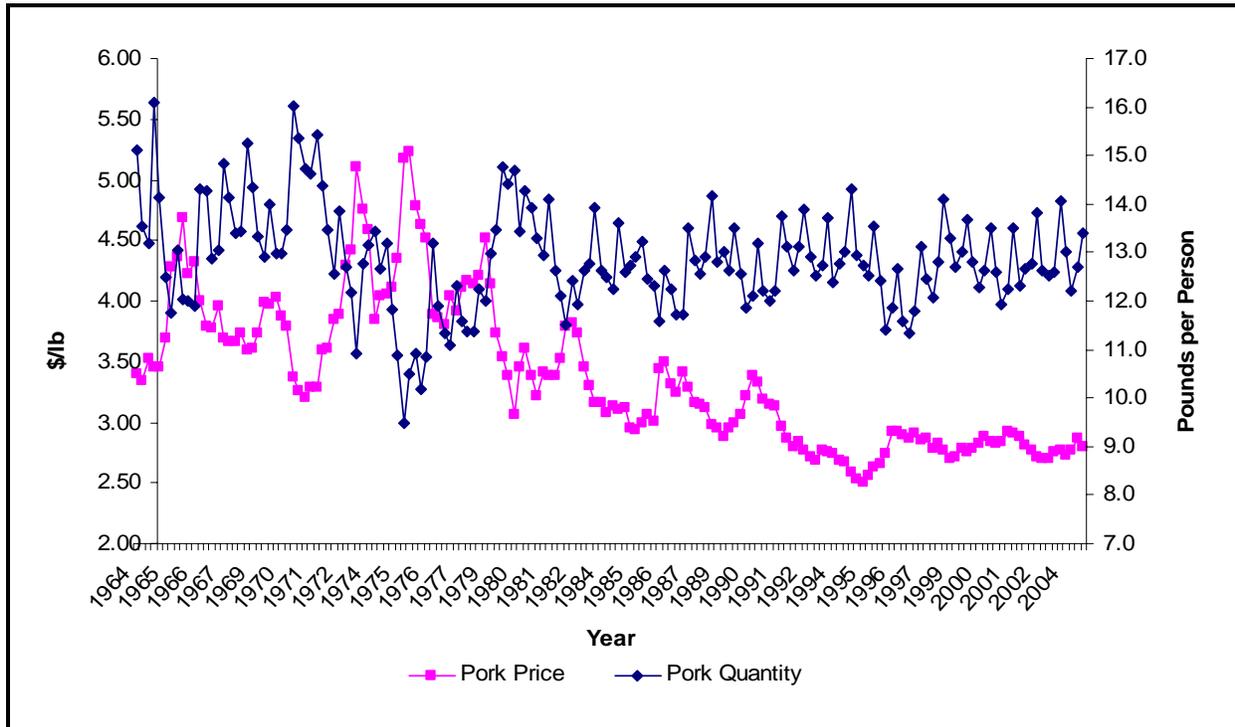
U.S. Department of Agriculture, Economic Research Service. 2004c. "Food Consumption (Per Capita) Data System, Food Availability." Washington, DC. <<http://www.ers.usda.gov/data/foodconsumption/FoodAvailSpreadsheets.htm#mtfcc>>.

rebound when the significant price spike in the last quarter of 2003 coincided with a considerable, though temporary, decline in consumption levels. After the price spike tempered, consumption levels were reestablished at previous levels.

Figure 1-3 reveals that U.S. quarterly pork consumption is seasonal but has remained steady at 13 pounds per capita (approximately 51.5 pounds per capita annually) over the period 1964 to 2004. Per capita pork consumption declined to as little as 9.5 pounds in the third quarter of 1975 and was as much as 16.1 pounds in the fourth quarter of 1964. U.S.

Figure 1-3. U.S. Quarterly Per Capita Pork Consumption (lbs per person) and Real Retail Pork Price (\$/lb) (2004 dollars), 1964–2004

As with beef, the inverse relationship between pork prices and pork consumption has weakened over time.



Sources: U.S. Department of Agriculture, Economic Research Service. 2004g. *Red Meat Yearbook*. Stock #94006. Washington, DC: USDA. <<http://usda.mannlib.cornell.edu/data-sets/livestock/94006/>>.

U.S. Department of Agriculture, Economic Research Service. 1994. "Livestock and Meat Statistics." *Red Meat Yearbook*, Statistical Bulletin No. 885. Washington, DC: USDA.

U.S. Department of Agriculture, Economic Research Service. 2005. *Livestock, Dairy, & Poultry Outlook*. Washington, DC: USDA. <<http://www.ers.usda.gov/publications/ldp/>>.

U.S. Bureau of Labor Statistics. "Consumer Price Index—All Urban Consumers, U.S. All Items." <<http://data.bls.gov/cgi-bin/surveymost?cu.>> Accessed April 18, 2005.

U.S. Department of Commerce, Bureau of Economic Analysis. National Income and Product Accounts Table, Table 2.6 Personal Income and Its Disposition, Monthly. Washington, DC: U.S. Department of Commerce. <<http://www.bea.gov/bea/dn/nipaweb/SelectTable.asp?Selected=N>>.

U.S. Department of Agriculture, Economic Research Service. 2004c. "Food Consumption (Per Capita) Data System, Food Availability." Washington, DC. <<http://www.ers.usda.gov/data/foodconsumption/FoodAvailSpreadsheets.htm#mtpcc>>.

quarterly real retail pork prices measured in 2004 dollars have decreased over the entire period. During the mid-1970s, real retail pork prices exceeded \$5.00 per pound, reaching a peak of \$5.23 per pound (2004 dollars) in the fourth quarter of 1975. After this peak, real retail pork prices have been declining and have most recently stabilized at around \$2.75 per pound.

Figure 1-3 also shows that, similar to the beef industry, the inverse relationship between retail pork prices and consumption levels weakened between 1964 and 2004. This inverse relationship was quite strong up to about the early 1980s, and

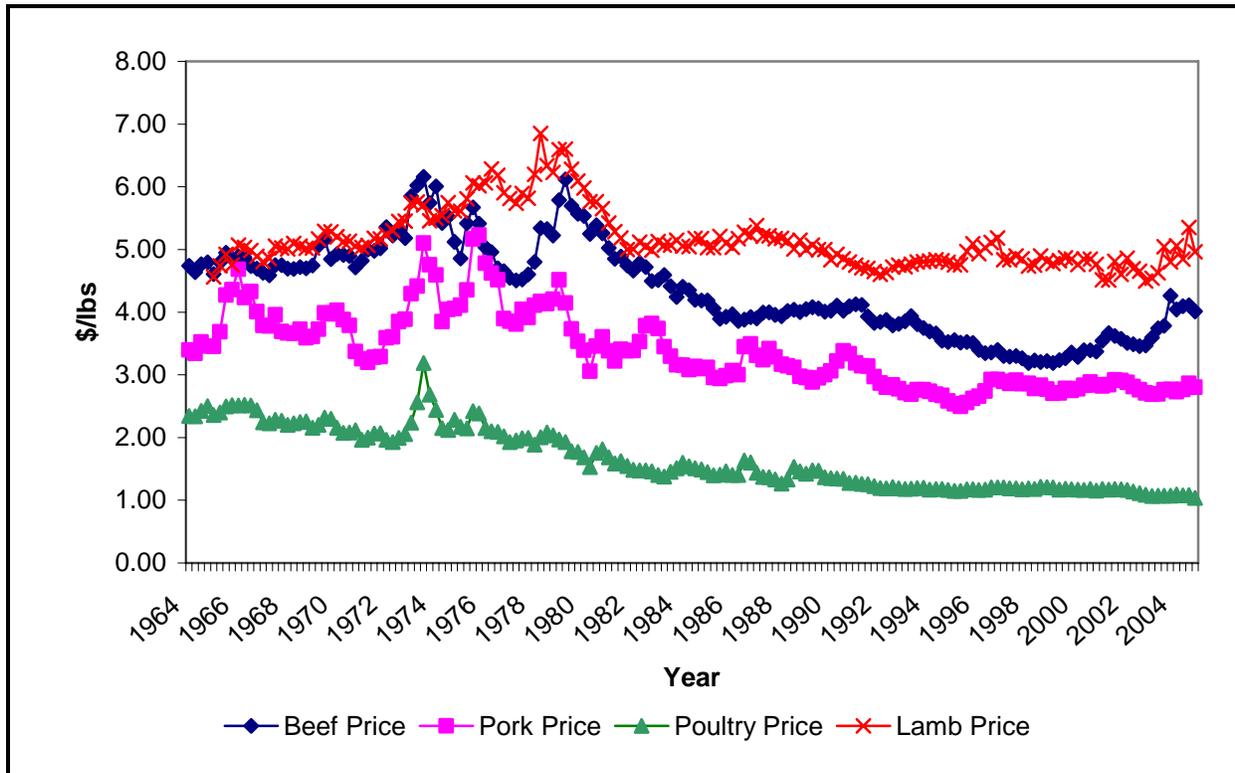
then consumption levels appear to have become less responsive to changes in real retail prices.

Figure 1-4 shows how relative real quarterly price levels for beef, pork, lamb, and poultry measured in 2004 dollars behaved over the period 1964 through 2004. During this period, the ranking of the most expensive to least expensive for the most part remains the same: lamb is the most expensive per pound, closely followed by beef and pork, and then poultry at a significantly lower price. However, in several periods prior to 1975, beef prices were slightly more expensive than lamb prices. During several periods, pork prices were almost as high as beef prices for a quarter or so (e.g., in the first quarter of 1966 and the fourth quarter of 1975), and in some periods, all three meats have experienced sharp rises (e.g., in 1974). Overall, the real prices of meat have declined steadily over the last several decades, and since the mid-1990s, prices have stabilized with an exception being the recent spike in beef prices.

Figure 1-5 shows how the composition of beef, pork, and poultry consumption has changed over the period 1964 through 2004. During this period, total meat (beef, pork, and poultry) per capita consumption on an annual basis has increased 27.8%. Specifically, in 1964 per capita consumption of beef, pork, and poultry combined was 171.2 pounds, and in 2004 it was 218.8 pounds (an increase of 47.6 pounds). Figure 1-5 illustrates that this increase can be attributed entirely to the substantial increase of poultry consumption, which averaged 9.7 pounds per quarter in 1964 compared with 25.4 pounds in 2004, an increase of 15.7 pounds per quarter (62.8 pounds on an annual basis). Poultry's consumption level can be compared with beef and pork consumption levels, which averaged 18.7 and 14.5 pounds per quarter, respectively, in 1964 and were more recently 16.5 and 12.8 pounds per quarter, or 2.2 and 1.7 pounds less, respectively, in 2004. The increase in poultry consumption has been steady over the previous 4 decades, and the decline in beef consumption began in the mid-1970s. Pork consumption has remained relatively stable with only a slight downward trend.

Figure 1-4. U.S. Quarterly Retail Beef, Pork, Lamb, and Poultry Prices (2004 dollars), 1964–2004

The real prices for meat and poultry have been declining over time, but the relative ranking of beef, pork, lamb, and poultry prices has stayed the same.



Sources: U.S. Department of Agriculture, Economic Research Service. 2004g. *Red Meat Yearbook*. Stock #94006. Washington, DC: USDA. <<http://usda.mannlib.cornell.edu/data-sets/livestock/94006/>>.

U.S. Department of Agriculture, Economic Research Service. August 2004f. *Poultry Yearbook*. Washington, DC: USDA. <<http://usda.mannlib.cornell.edu/data-sets/livestock/89007/>>.

U.S. Department of Agriculture, Economic Research Service. 1973. "Livestock and Meat Statistics." Statistical Bulletin No. 522. Washington, DC: USDA.

U.S. Department of Agriculture, Economic Research Service. 1989. "Livestock and Meat Statistics." Statistical Bulletin No. 784. Washington, DC: USDA.

U.S. Department of Agriculture, Economic Research Service. 1994. "Livestock and Meat Statistics." *Red Meat Yearbook*, Statistical Bulletin No. 885. Washington, DC: USDA.

U.S. Department of Agriculture, Economic Research Service. 2005. *Livestock, Dairy, & Poultry Outlook*. Washington, DC: USDA. <<http://www.ers.usda.gov/publications/ldp/>>.

U.S. Bureau of Labor Statistics. "Consumer Price Index—All Urban Consumers, U.S. All Items." <<http://data.bls.gov/cgi-bin/surveymost?cu>>. Accessed April 18, 2005.

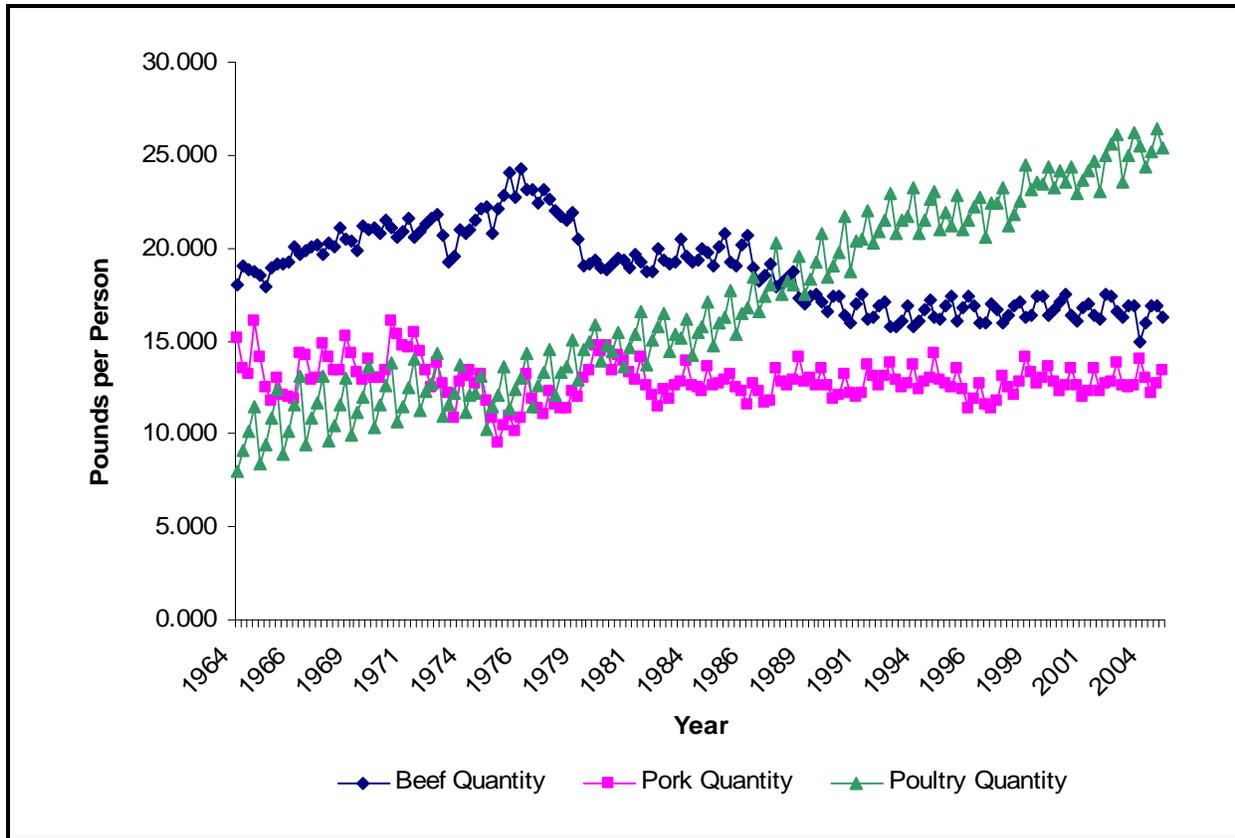
American Sheep Industry (ASI) Association. 2003/2004. "U.S. Sheep Industry Market Situation Report." Centennial, CO: ASI.

McDonnell, T., ASI. 2005. Personal communication with the study team.

Lamb consumption is not shown in Figure 1-5 because its scale compared with beef, pork, and poultry is extremely small. In the late-1960s, quarterly per capita lamb consumption was approximately 0.8 pounds, and consumption trended downward until 1980. Since then, lamb consumption has remained flat at approximately 0.3 pounds per person per quarter.

Figure 1-5. U.S. Quarterly Per Capita Beef, Pork, and Poultry Consumption (lbs per person), 1964–2004

Per capita meat and poultry consumption has increased over time, but the majority of the increase is due to increased poultry consumption. Lamb consumption is not included in the graph because it would appear only slightly above the horizontal axis.



Sources: U.S. Department of Agriculture, Economic Research Service. 2004g. *Red Meat Yearbook*. Stock #94006. Washington, DC: USDA. <<http://usda.mannlib.cornell.edu/data-sets/livestock/94006/>>.

U.S. Department of Agriculture, Economic Research Service. August 2004f. *Poultry Yearbook*. Washington, DC: USDA. <<http://usda.mannlib.cornell.edu/data-sets/livestock/89007/>>.

U.S. Department of Agriculture, Economic Research Service. 1994. "Livestock and Meat Statistics." *Red Meat Yearbook*, Statistical Bulletin No. 885. Washington, DC: USDA.

U.S. Department of Agriculture, Economic Research Service. 2005. *Livestock, Dairy, & Poultry Outlook*. Washington, DC: USDA. <<http://www.ers.usda.gov/publications/ldp/>>.

U.S. Department of Commerce, Bureau of Economic Analysis. National Income and Product Accounts Table, Table 2.6 Personal Income and Its Disposition, Monthly. Washington, DC: U.S. Department of Commerce. <<http://www.bea.gov/bea/dn/nipaweb/SelectTable.asp?Selected=N>>.

U.S. Department of Agriculture, Economic Research Service. 2004c. "Food Consumption (Per Capita) Data System, Food Availability." Washington, DC: USDA. <<http://www.ers.usda.gov/data/foodconsumption/FoodAvailSpreadsheets.htm#mtfcc>>.

1.1.2 Changes in Patterns of Meat Sales by Food Service Operators and Retailers

In 2003, U.S. consumers spent approximately \$904 billion on food. These expenditures comprised \$497 billion spent on food at home and \$407 billion spent on food away from home (USDA/ERS, 2003, 2004a). Food expenditures by families and

individuals accounted for 10.3% of disposable personal income in 2003, down from 12.5% in 1980. Food store sales reached \$370 billion, accounting for over 74% of food-at-home sales. Food store sales have grown relatively slowly in recent years because of slow population growth and aggressive competition from other retailers, including mass merchandisers and warehouse club outlets.

Fresh meat, poultry, and fish sales comprised 13.3% of supermarket sales, making meat, poultry, and fish one of the highest selling categories in retail stores (Food Marketing Institute, 2004). The 2004 National Meat Case Study (NMCS) (2004) found that beef, pork, and chicken represented 90% of fresh meat in terms of linear feet. Beef's share was 43%, pork's share was 22%, and chicken's share was 25%. The study also found that lamb's meat case representation grew in 2004, while veal's declined.

Merchandising strategies for the total meat department appear to be shifting, resulting in a 6 percentage point decline for fresh meat and poultry's share of total linear feet and a corresponding increase in the share of linear feet for processed meats, ready-to-eat (RTE) products, and ready-to-cook products. Pork had the highest percentage of ready-to-eat packages, followed by turkey at 8%, chicken at 6%, and whole muscle beef at 4%.

The 2004 National Meat Case Study (NMCS) (2004) also found the following:

- Twenty-two percent of all meat packages carried a natural claim.
- Enhanced product represented 21% of all packages, with pork having the largest share at 45% followed by chicken with 23% and beef with 16%.
- A strong shift from in-store packaging of fresh meat products to packages prepared off site was evident (case-ready products increased from 49% in 2002 to 60% in 2004, with poultry having the largest share followed by ground beef, pork, lamb, veal, and whole muscle beef).
- Supplier-branded packages have become more prominent, with half of all self-serve packages carrying a supplier brand and 12% having a store brand (supplier-branded packages were most prominent in turkey with

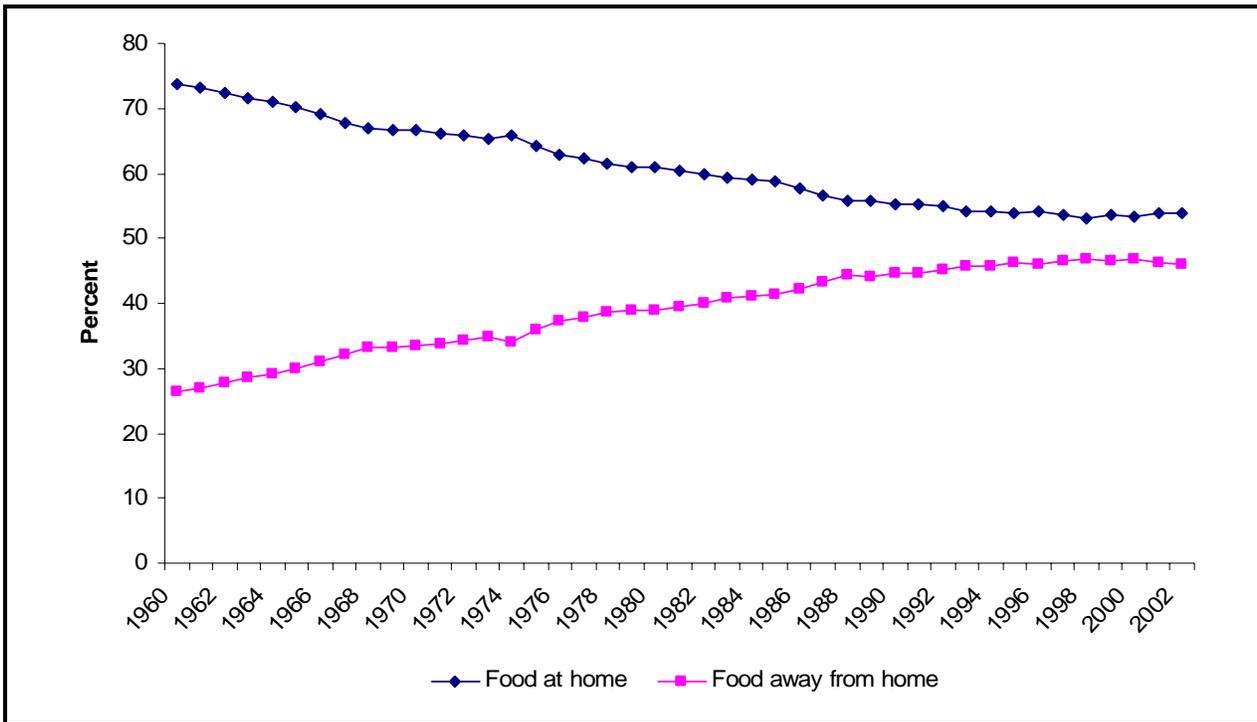
86%, chicken with 77%, and pork with 56%, but the majority of beef packages were not branded).

Food service firms exhibited a similar pattern of slow growth and intense competition.

Food service firms exhibited a similar pattern of slow growth and intense competition. Restaurants accounted for almost \$331 billion, or 81%, of total food service sales. As shown in Figure 1-6, consumers spent nearly half their food expenditures at restaurants and take-out establishments in 2002.

Figure 1-6. Expenditures for Food at Home and Food Away from Home, 1960–2002

Expenditures on food away from home have increased steadily, while expenditures on food consumed at home have decreased steadily.



Source: U.S. Department of Agriculture, Economic Research Service. 2004a. "Briefing Room-Food Market Structures: Food Service." ERS Food Expenditure Series. <<http://www.ers.usda.gov/Briefing/FoodMarketStructures/foodservice.asp>>.

The relative expansion of the fast food market segment appears to have stalled in recent years. In 2002, sales at full-service restaurants accounted for a slightly larger share of total away-from-home food. Also, for meals eaten at home, an increasing number of those meals are fully prepared or partially prepared by outside sources. Supermarkets are attempting to regain food dollars lost to the food service industry by offering a menu of fully prepared meals. It is likely that the opportunity offered by food service for food retailing is quite large because demographic factors are changing the way people eat.

Large food service chains are continuing to gain market share. The top 50 U.S. restaurant franchisers accounted for 39% of separate eating place sales in 2000 compared with 28% in 1999 (Harris et al., 2002).

This consolidation has resulted in the emergence of very large retail groups, such as Kroger, Albertson's, Safeway, WalMart, and Ahold USA.

Competition in the retail sector from nontraditional retailers has been the catalyst for a wave of consolidation and transformation, which has seen the continued rise of supermarkets and hypermarkets and the steady decline of small traditional retail outlets.⁴ For many food retailers, consolidation is driven by the competitive threat of WalMart and other discount retailers that have added retail food sales to their stores. This consolidation has resulted in the emergence of very large retail groups, such as Kroger, Albertson's, Safeway, WalMart, and Ahold USA. As shown in Figure 1-7, the top-four food retailers accounted for about 32% of U.S. retail food sales in 2001 compared with 19% for the top-four food retailers in 1997.⁵

The changes in consumer expectations in terms of product quality, as well as the search for profitable niche markets, have led retailers to modify their merchandising and purchasing practices in the meat, fruit, and vegetable sectors.

The mergers among the large retailers are part of a strategy to seek additional growth opportunities and cost savings in the form of lower procurement costs and lower operating costs. Retailers are also attempting to gain sales by providing products that increase satisfaction to consumers who are characterized as time starved, nutrition conscious, quality conscious, and environmentally conscious. These efforts include introducing natural food products, expanding prepared food offerings, promoting store or private-label brands, expanding frequent shopper programs, and introducing self-service checkouts.

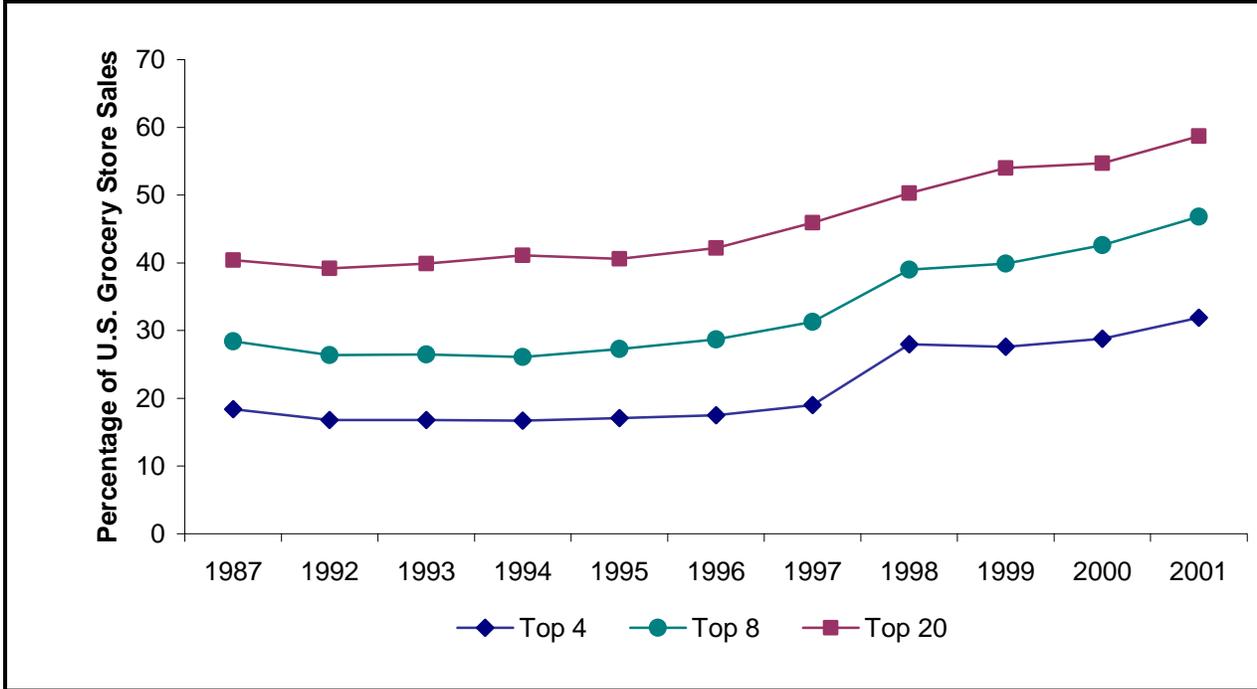
The changes in consumer expectations in terms of product quality, as well as the search for profitable niche markets, have led retailers to modify their merchandising and purchasing practices in the meat, fruit, and vegetable sectors. These retailer initiatives have resulted in increased segmentation of product offerings on store shelves and in the meat case. Retailers now offer, in addition to standard products, differentiated products focusing on health, convenience, taste,

⁴ A hypermarket is a store that combines a supermarket and a department store. In the United States, WalMart, Fred Meyer (part of the Kroger chain), Meijer, and Target operate hypermarkets.

⁵ National concentration ratios may not reflect actual market power because supermarkets tend to compete on a local level.

Figure 1-7. Four-Firm Concentration Ratios (CR4s) for Grocery Retailers, 1987–2001^a

The grocery retail sector has increased substantially since the mid-1990s.



^a Ratios based on the North American Industry Classification System (NAICS), which reclassified some retail sales, resulting in higher concentration shares than under the previous Standard Industrial Code (SIC) classification system.

Source: U.S. Department of Agriculture, Economic Research Service. 2003. "Briefing Room-Food Market Structures: Food Retailing. ERS Food Expenditure Series." <<http://www.ers.usda.gov/Briefing/FoodMarketStructures/foodretailing.htm>>.

and information about how the food was produced. For example, several meat processors now offer case-ready branded meats to satisfy large retailers. As closer relationships are formed, processors are increasingly using AMAs to improve the quality of animal production and to ensure traceback capabilities.

New technologies, such as source verification (Meyer, 2001), are being developed to meet consumers' expectations for a healthy, safe product. Source verification systems allow the meat system to identify locations where problems exist and allow producers to track livestock as they move through the system, thereby providing information on quality. Producers can use this information to improve their decisions regarding production methods to better meet consumer demands.

1.2 OVERVIEW OF MARKETING ARRANGEMENTS IN MEAT DISTRIBUTION

Key dimensions that define a marketing arrangement in meat distribution and sales include

- procurement or sales method and
- pricing method (including formula pricing base and internal transfer pricing method).

In the context of the meat industry, as described above, we describe the types of marketing arrangements used in the sale of meat products from the packer downstream to different types of buyers. In this report, cash or spot market transactions refer to transactions that occur immediately or “on the spot.” These include auction barn sales; video or electronic auction sales; sales through order buyers, dealers, and brokers; and direct trades. The terms “cash market” and “spot market” are used interchangeably. “Alternative marketing arrangements” refer to all possible alternatives to the cash or spot market. In the distribution and sales of meat products downstream from the packer, alternatives to the spot market primarily include forward contracts and marketing agreements. In addition to the type of procurement or sales method, the other key dimension that defines a marketing arrangement is the pricing method, which is further defined by formula base, if formula pricing is used, and internal transfer pricing method, if the product is internally transferred within a single company.

Transactions may be for carcasses, single cuts, or a variety of processed products. Sales representatives usually start negotiations for individual products based on a price list and usually must meet sales quotas. Listed prices are discounted if inventories of that cut are plentiful. Other pricing practices used for meat products might include the following:

- two-part pricing—includes a fixed payment (e.g., slotting allowance) and a per-unit price;
- volume discounts—larger shipments have lower per-unit prices;
- exclusive dealings—the buyer is prohibited from buying and reselling the same products from another supplier; and
- bundling—the buyer must purchase other related products to receive a lower price.

In addition, the meat industry uses different types of supply chain structures to meet downstream customer needs. These include

- brand licensing programs,
- marketing alliances, and
- new-generation cooperatives.

Brand licensing programs are generally breed based (e.g., Certified Angus Beef, Certified Hereford Beef), although they need not be. These programs require livestock to meet a certain genetic “template,” thereby creating value by centering the program around a branded product that uses breed to convey a certain level of quality. Licensing programs tend to be loosely coordinated, with the only obligation being the certification of participants (Anton, 2002).

Marketing alliances are programs initiated by processors and retailers. These programs are owned by operations that purchase finished livestock from livestock producers and/or feedlots using a quality-based grid that typically has quality, yield, and process requirements. Value is added by creating brand identification for niche products (such as Nolan Ryan’s or Laura’s Lean).

New generation cooperatives, such as Ranchers Renaissance or U.S. Premium Beef, typically limit membership, impose strict quality and delivery standards, and require a fairly substantial up-front investment. The structure is more formal than the vertical arrangements discussed above. Shares establish a two-way contract between the members and the cooperative, which requires members to sell a certain number of livestock through the cooperative and then the cooperative buys these livestock when ready for market. A grid-pricing system is generally used, thus providing members with a further incentive to comply with product specifications. In addition to premiums, dividends may be paid to members (Brocklebank and Hobbs, 2004).

1.3 DESCRIPTION OF THE MEAT PROCESSOR TRANSACTIONS DATA

Many of the analyses conducted for this volume were based on transactions data obtained from meat processors that receive meat inputs from packers and sell meat products to a variety of buyer types. We obtained usable meat purchase data from 32 meat processing plants (17 beef and 15 pork) and usable meat sales data from 11 meat processing plants (6 beef and 5

pork).⁶ Data from lamb breaking plants were analyzed with the lamb packer data in Volume 5 of this report. We describe the data preparation process and content of the beef and pork records of the meat processor purchase data set and the sales data set below.

1.3.1 Meat Processor Purchase Transactions Data

For this volume of the report, we used meat product purchase records from 32 plants and meat product sales records from 11 plants in addition to other data sources.

Before tabulating and analyzing the meat processor purchase transactions data, we systematically examined the purchase data set to isolate and address data inconsistencies, data-reporting errors, or extraneous data. Specific data preparation procedures were as follows:

- **Meat type not identifiable.** Plants were asked to indicate whether their meat product was predominantly beef, pork, or lamb. For some data records, more than one meat type was chosen. After reviewing the product description, the predominant meat type could not be determined. These records were deleted (3 records).
- **Lamb products.** The meat product was predominantly lamb in fewer than 50 data records. Because these records represented an insignificant amount of the reported products, they were deleted (43 additional records).
- **Missing meat type.** Data records that did not indicate the type of meat predominantly used in the meat product were deleted (3,259 additional records).
- **Missing total cost.** Data records that did not contain total cost of the transaction were deleted (2,889 additional records).
- **Out-of-range prices.** Data records in which the cost per pound was greater than \$50 per pound were deleted. Based on their product descriptions, these records were deemed to be erroneous (6 additional records).

Before data preparation, the data set included 60,031 meat processor purchase records. After data preparation, the final data set included 53,831 meat processor purchase records. Of these records, 73% of the pounds were pork products and 27% were beef products.

⁶ Meat processing plants were asked to provide sales data only if the products they sold contained at least 50% meat by weight.

1.3.2 Meat Processor Sales Transactions Data

Fewer plants provided sales data than purchase data because we requested data only for products that were at least 50% meat. Thus, plants that use meat primarily as an ingredient in meat products were not required to provide sales data. Before tabulating the sales transactions data, we systematically examined the sales data set to isolate and address data inconsistencies, data-reporting errors, or extraneous data. Specific data preparation procedures were as follows:

- **Out-of-range weights.** Data records with a total weight less than or equal to 1 pound were deleted. Most of these records were either sales samples or erroneously reported (3,471 records).
- **Out-of-range list prices.** Data records for which the list price per pound was between \$0.30 and \$30 were retained. After reviewing the list prices of similar products, we determined that all prices outside this range were erroneously reported and were subsequently deleted (93 additional records).

Before data preparation, the data set included 851,859 meat sales records. After data preparation, the final data set included 848,295 meat sales records. Of these records, 64% were beef products and 36% were pork products.

1.4 ORGANIZATION OF THIS STUDY VOLUME

In Section 2 of this volume, we describe the role of AMAs in meat sales and distribution. The analyses are primarily descriptive and are based on the survey and transactions data. References follow in Section 3.

2

Volume and Quality Differences Associated with Alternative Marketing Arrangements

In this section, we present results on volume and quality differences associated with alternative marketing arrangements used by meat processors,¹ food wholesalers, food exporters, food service operators, and grocery retailers. The analyses in this section are based on the meat purchase and sales transactions data provided by meat processors and on the survey results for the industry surveys across all of these channels.

2.1 MEAT DISTRIBUTION VOLUMES BY TYPE OF MARKETING ARRANGEMENT

Volume 2 of this report discussed in detail the data collection methodology and the summaries of the surveys from downstream participants including processors, wholesalers, retailers, food service operators, and exporters. The results of the AMA use and pricing methods are summarized here followed by a summary of the transactions data from the meat processors.

¹ Meat processors are firms that process meat, but that do not slaughter livestock.

2.1.1 Summary of Downstream Survey Responses

We summarize the results of the downstream survey responses by each type of market participant below. Note that the survey responses represent a broad range of company sizes, including many small companies.

Meat Processors

Meat processors purchased most of their product on the spot market, but they also used other purchasing methods. The survey results indicated the following:

- An estimated 91% of the plants used the spot market for purchases, and 63% of plants used it exclusively.
- Forward contracting was used by nearly 20% of plants.
- Marketing agreements and internal company transfers were each used by approximately 13% of the plants.

The two most common methods used by meat processors to price meat purchases were price lists and individually negotiated prices. The specific survey results indicated the following:

- Approximately 60% of plants used each method.
- Formula pricing was used by 32% of plants and the most common base was a U.S. Department of Agriculture (USDA) publicly reported price (63%).
- Internal transfer pricing was used by 13% of plants.

Meat processors reported that 41% of sales were to wholesalers and distributors, 29% to food service operators, 21% to retailers, and 8% to other processors and food manufacturers. The specific survey results indicated the following results related to meat processor sales to downstream buyers:

- Approximately 60% of plants used the cash or spot market.
- Approximately 10% of plants used forward contracts.
- Approximately 10% or more of plants used marketing agreements.
- Approximately 9% of sales to other processors/manufacturers were internal transfers.

Wholesalers

The most common pricing methods for wholesaler purchases on a dollar basis were flat pricing² (56% of dollar purchases), formula pricing (27% of dollar purchases), and or-better pricing³ (12% of dollar purchases). For companies using formula pricing, the most common base was a USDA reported price (61% of companies).

Flat pricing was the most common pricing method for meat sales as well (63% of meat dollar sales compared with 24% for formula pricing). Most formula pricing agreements were based on USDA reported prices (52% of companies) or retail prices (36%).

Exporters

The most common pricing methods to purchase meat employed by exporters were flat pricing (76% of dollar purchases) and to a lesser extent formula pricing, or-better pricing, and floor-and-ceiling pricing.⁴ The most common base for formula pricing was a USDA reported price.

Retailers

The most common pricing methods for purchasing meat by retailers were flat pricing (53% of dollar purchases), formula pricing (21% of dollar purchases), or-better pricing (12% of dollar purchases), and floor-and-ceiling pricing (12% of dollar purchases). Formula-priced meat purchases were most often based on retail prices (62% of companies) or USDA reported prices (35% of companies).

Food Service Operators

The most common pricing methods to purchase meat for food service operators were flat pricing (48% of dollar purchases), or-better pricing (21% of dollar purchases), floor-and-ceiling pricing (16% of dollar purchases), and formula pricing (14% of

² Under flat pricing, buyers and sellers agree to a specific dollar per pound for a specified period.

³ Under or-better pricing, buyers and sellers agree to a specific dollar per pound for a specified period; however, if the market price decreases during that time, then the purchase (sales) price decreases as well.

⁴ Under floor-and-ceiling pricing, agreed upon purchase (sales) price increases and decreases with market prices, but the price has a lower limit and an upper limit for a specified period.

dollar purchases). The formula base price was most often tied to a retail price (61% of companies).

2.1.2 Summary of Meat Processor Transactions Data

We summarize the meat processor transactions data for purchases and for sales below. Meat processors were required to provide sales data only for products that contained at least 50% meat by weight. Only the largest processing plants were asked to provide transactions data. Smaller processing plants would have faced a significant burden in providing transactions data and were thus excluded.

Meat Processor Purchases

Thirty-two meat processing plants provided transactions data on purchases of beef and pork between October 2002 and March 2005. These data included nearly 54,000 transactions or records representing 1.227 billion pounds of product (Table 2-1). The respondents included 17 beef processing plants (owned by 11 companies) representing 27% of the volume by weight and 15 pork processing plants (owned by 9 companies) representing 73% of the volume by weight.

Table 2-1. Summary of Available Data on Purchase of Meat Products by Processors, October 2002–March 2005

Type of Purchase	Number of Plants	Number of Transactions (Records)	Number of Pounds	Percentage of Pounds Purchased
Beef	17	11,726	331,068,124	27.0%
Pork	15	42,105	896,226,877	73.0%
Total	32	53,831	1,227,295,001	100.0%

Note: Plants that are lamb breakers are not included in this summary.

It is important to note that these processors varied greatly in final products produced and in the meat they purchased (Table 2-2). Of the beef processors’ transactions, nearly half were highly processed, with 39% RTE. Another 22% of the records were ground beef and trimmings. Primal cuts and carcasses or sides were very small percentages. An additional 23% of the records were classified as other or missing. Pork processors had fewer transactions than beef with processed product. Ground pork and trimmings accounted for 19% of the records, and approximately a fourth of the purchase records

Table 2-2. Summary Statistics for Meat Purchase Lot Characteristics, October 2002–March 2005

Statistic	Number of Records	Mean	St. Dev.
Total weight (lbs)	53,831	22,799	43,331
Total cost (\$)	41,595	1.14	0.58
Meat cost (\$)	53,088	1.06	0.55
Shipping cost (\$)	18,953	0.01	0.02
Miscellaneous cost (\$)	21,595	0.00	0.01

Statistic	Number of Records	Percentage of Records
Branded	15,648	29.1
Certification	0	0.0
Beef product classification		
Carcass or side	D	D
Primal cut	D	D
Subprimal cut	0	0.0
Ground and trimmings	3,783	22.4
Portion cut	D	D
Case Ready	0	0.0
Processed RTE	6,516	38.6
Processed NRTE	D	D
Other or missing	3,861	22.9
Pork product classification		
Carcass or side	D	D
Primal cut	D	D
Subprimal cut	13,034	31.0
Ground and trimmings	8,171	19.4
Portion cut	0	0.0
Case ready	0	0.0
Processed RTE	9,893	23.5
Processed NRTE	D	D
Other or missing	6,798	16.2
Tenderized/marinated	D	D
Added ingredients	11,069	20.6
Refrigeration		
Chilled/fresh	32,906	61.1
Frozen	8,879	16.5
Other or missing	12,046	22.4

D = Results suppressed.

were RTE or NRTE. However, 31% of pork records were subprimal cuts and a very small percentage were primal cuts and whole or sides of carcasses.

Twenty-nine percent of the transactions were identified as branded product. Twenty-one percent had added ingredients and a smaller percentage were tenderized or marinated. Over half of the purchase transactions were for chilled/fresh product (61%), and 17% were for frozen product.

The meat processors providing transactions data were asked to identify the purchase method used for each record (Table 2-3). Beef processors purchased a moderate percentage of their beef tonnage on the spot market. A similar share by weight was purchased with forward contracts (28%), but it was a smaller number of transactions, indicating that each transaction was larger. The average size of a forward contract transaction was nearly 48,000 pounds compared with 18,200 pounds for spot market purchases. Marketing agreement trades made up 17% of records, but only 7% of product, and internal transfers were virtually nonexistent for beef. However, 39% of the product and 26% of the records were listed as other or were missing, indicating that the processors contacted either did not identify with the categories provided or do not track this information.

Pork processors acquired much more of their product through internal transfer than did beef processors. Marketing agreements accounted for nearly half of the records (48%), but 23% of the product. The spot market represented a smaller percentage of the product and records. Forward contracts were less than 1% of either product or transactions, and other or missing was 32% of product and 24% of transactions.

Based on the totals in Table 2-3, spot market, marketing agreement, and internal transfer arrangements had nearly equal shares of combined product traded. However, this average is not very meaningful because pork purchase methods were quite different from beef.

The meat processors were also asked to identify the pricing method used for each record (Table 2-4). Other than price list, which was used only rarely for beef, the pricing methods differed substantially. As with purchase method, a moderate percentage of pork products and no beef products were acquired through internal transfer. Thirty-nine percent of beef

Table 2-3. Summary of Meat Purchase Methods by Meat Type, October 2002–March 2005

Product Type	Cash or Spot Market	Forward Contract	Marketing Agreement	Internal Company Transfer	Other or Missing	Total
Beef products						
No. of records	D	1,920	1,975	D	3,050	11,726
% of records		16.4%	16.8%		26.0%	100.0%
No. of pounds	D	91,822,289	24,367,462	D	127,761,734	331,068,124
% of pounds		27.7%	7.4%		38.6%	100.0%
Pork products						
No. of records	D	175	20,024	D	10,139	42,105
% of records		0.4%	47.6%		24.1%	100.0%
No. of pounds	D	6,003,967	204,342,874	D	282,539,920	896,226,877
% of pounds		0.7%	22.8%		31.5%	100.0%
All products						
No. of records	13,457	2,095	21,999	3,091	13,189	53,831
% of records	25.0%	3.9%	40.9%	5.7%	24.5%	100.0%
No. of pounds	253,653,755	97,826,256	228,710,335	236,803,000	410,301,654	1,227,295,002
% of pounds	20.7%	8.0%	18.6%	19.3%	33.4%	100.0%

D = Results suppressed.

Table 2-4. Summary of Meat Purchase Pricing Methods by Meat Type, October 2002–March 2005

Product Type	Price List	Negotiated	Formula Pricing	Internal Transfer Pricing	Other or Missing	Total
Beef products						
No. of records	D	6,013	2,793	D	D	11,726
% of records		51.3%	23.8%			100.0%
No. of pounds	D	129,742,790	76,895,605	D	D	331,068,124
% of pounds		39.2%	23.2%			100.0%
Pork products						
No. of records	0	1,130	31,992	D	D	42,105
% of records	0.0%	2.7%	76.0%			100.0%
No. of pounds	0	3,845,502	501,624,750	D	D	896,226,877
% of pounds	0.0%	0.4%	56.0%			100.0%
All products						
No. of records	D	7,143	34,785	D	8,758	53,831
% of records		13.3%	64.6%		16.3%	100.0%
No. of pounds	D	133,588,292	578,520,356	D	277,727,796	1,227,295,002
% of pounds		10.9%	47.1%		22.6%	100.0%

D = Results suppressed.

pounds and 51% of beef transactions were negotiated pricing compared with 0.4% and 3% of pork pounds and transactions that were negotiated. Formula pricing represented 76% of transactions and 56% of product weight for pork. For beef, formula pricing was approximately 23% of both transactions and weight. Other or missing represented 23% of product pounds and 16% of the records overall.

The most common base for pricing formulas was the USDA reported price, covering 99% of pork and 55% of beef product that was priced by formula (Table 2-5). The other base often used for purchased beef was a subscription service. Although nearly all pork pricing formulas are based on USDA reported prices, it is worth noting that wholesale pork, while reported by USDA, is not covered under MPR.

Table 2-5. Summary of Types of Formula Bases Used for Meat Purchases by Meat Type, October 2002–March 2005

Product Type	USDA-Reported Price	Subscription Service Price	Other Market Price	Other or Missing	Total
Beef products					
No. of records	1,443	D	0	D	2,793
% of records	51.7%		0.0%		100.0%
No. of pounds	42,072,923	D	0	D	76,895,605
% of pounds	54.7%		0.0%		100.0%
Pork products					
No. of records	31,316	0	D	D	31,992
% of records	97.9%	0.0%			100.0%
No. of pounds	494,521,517	0	D	D	501,624,750
% of pounds	98.6%	0.0%			100.0%
All products					
No. of records	32,759	D	D	D	34,785
% of records	94.2%				100.0%
No. of pounds	536,594,440	D	D	D	578,520,356
% of pounds	92.8%				100.0%

D = Results suppressed.

Branded meat purchases by beef and pork processors accounted for 37% of product pounds reported by participants (Table 2-6). Sixty percent of the spot market product purchased was branded, while 25% of the forward contract product was branded.

Table 2-6. Meat Branding by Purchase Method, October 2002–March 2005

Quality Measure	Cash or Spot Market	Forward Contract	Marketing Agreement	Internal Company Transfer	Other or Missing	Total
Branded						
No. of pounds	153,155,971	24,037,197	0	D	D	454,920,965
% of pounds	60.4%	24.6%	0.0%			37.1%

D = Results suppressed.

The type of product purchased by processors was somewhat related to purchase methods (Table 2-7). Those buying unprocessed meat were much more likely to use internal transfer than other methods. Those buying processed meat were more likely to use a marketing agreement (31%) than forward contracts or internal transfers. Virtually no processed product was purchased on the spot market. The internal transfer of unprocessed meat was predominately pork.

Meat Processor Sales

Eleven processors (six beef and five pork processors) provided sales transactions data (Table 2-8). Part of the decrease in reporting between meat purchases and meat sales is that the product must be at least 50% meat to be included in the study. Many products that processors prepared had less than 50% meat in the final product. Unlike the purchase data that had 53,831 records averaging 22,800 pounds per transaction, there were 848,295 sales records that averaged 771 pounds per transaction. Thus, processors play a distribution role in the value chain by purchasing large lots from a few firms and selling small lots to many small downstream buyers.

Sixty-eight percent of the transactions and 64% of the product sold was beef compared with pork (Table 2-8). Ninety percent of purchases were by retailers and 39% of transactions were of branded product (Table 2-9). The processors reporting produced only two products—case ready and processed RTE.

Table 2-7. Type of Alternative Marketing Arrangements Used for Meat Purchases by Meat Processors, by Level of Processing, October 2002–March 2005

Level of Processing	Type	Meat Purchase Method					Total
		Cash or Spot Market	Forward Contract	Marketing Agreement	Internal Company Transfer	Other or Missing	
Unprocessed meat	No. of records	4,022	1,630	D	D	D	29,659
	% of records	13.6%	5.5%				100.0%
	No. of lbs	74,548,393	73,546,089	D	D	D	671,698,640
	% of lbs	11.1%	10.9%				100.0%
Processed meat	No. of records	D	D	5,702	D	6,990	13,510
	% of records			42.2%		51.7%	100.0%
	No. of lbs	D	D	111,040,210	D	222,990,846	363,477,646
	% of lbs			30.5%		61.3%	100.0%
Other	No. of records	D	D	D	0	D	10,662
	% of records				0.0%		100.0%
	No. of lbs	D	D	D	0	D	192,118,716
	% of lbs				0.0%		100.0%
Total	No. of records	13,457	2,095	21,999	3,091	13,189	53,831
	% of records	25.0%	3.9%	40.9%	5.7%	24.5%	100.0%
	No. of lbs	253,653,755	97,826,256	228,710,335	236,803,000	410,301,654	1,227,295,002
	% of lbs	20.7%	8.0%	18.6%	19.3%	33.4%	100.0%

D = Results suppressed.

Table 2-8. Summary of Available Data on Sales of Meat Products by Processors, October 2002–March 2005

Type of Purchase	Number of Plants	Number of Transactions (Records)	Number of Pounds	Percentage of Pounds Purchased
Beef	6	574,286	417,846,936	64.0%
Pork	5	274,009	236,383,627	36.0%
Total	11	848,295	654,230,563	100.0%

Note: Plants that are lamb breakers are not included in this summary.

For beef, a higher percentage of product was case ready than processed RTE; for pork the opposite was true. Twenty-three percent of transactions were for products that were tenderized or marinated, and 100% had added ingredients. Approximately 97% of the product records were for fresh chilled product as opposed to frozen.

A high percentage of records and pounds did not identify the sales method, indicating that processors either do not identify the categories that were listed or do not track this information. Likewise, only a few beef sales transactions by meat processors reported being on negotiated pricing, and the vast majority were other or missing. Pork processors reported that approximately half of their transactions used negotiated pricing, and approximately one-fourth of their sales used formula pricing.

In summary, the meat processor purchases were heavily weighted by pork as 73% of the weight, and 78% of the transactions were by pork processors. The purchased product ranged from carcasses to RTE meats. Purchase and pricing methods differed by type of meat; pork had more internal transfers and marketing agreements, while beef had more spot market and forward contract usage. Buyers mix and match purchase and pricing methods as formula pricing was used as the pricing method for spot market, forward contracts, and marketing agreements. Likewise, individually negotiated prices were more common in forward contracts than spot markets. Finally, branded product was the majority of the spot market product and one-fourth of forward contracts and was not reported in marketing agreements or internal transfers. Thus,

Table 2-9. Summary Statistics for Meat Sales Characteristics, October 2002–March 2005

Statistic	Number of Records	Mean	St. Dev.
Total weight (lbs)	848,295	771	2,563
List price (\$)	848,295	1,911	6,269
Gross price (\$)	848,295	1,925	6,275
Price adjustments (\$)	821,968	10	98
Net price (\$)	848,295	1,901	6,266
Shipping cost (\$)	841,922	24	66
Commission cost (\$)	191,981	21	47

Statistic	Number of Records	Percentage of Records
Buyer type		
Meat processor/food manufacturer	D	D
Wholesaler/broker/distributor	26,583	3.1
Retailer	766,350	90.3
Food service operator	D	D
Foreign buyer	0	0.0
Other or missing	53,743	6.3
Branded	329,097	38.8
Other certification	0	0.0
Beef product type		
Primal cut	0	0.0
Subprimal cut	0	0.0
Ground and trimmings	0	0.0
Portion cut	0	0.0
Case ready	D	D
Processed RTE	D	D
Processed NRTE	0	0.0
Other or missing	0	0.0
Pork product type		
Primal cut	0	0.0
Subprimal cut	0	0.0
Ground and trimmings	0	0.0
Portion cut	0	0.0
Case ready	D	D
Processed RTE	D	D
Processed NRTE	0	0.0
Other or missing	0	0.0

(continued)

**Table 2-9. Summary Statistics for Meat Sales Characteristics, October 2002–March 2005
(continued)**

Statistic	Number of Records	Percentage of Records
Tenderized/marinated	195,442	23.0
Added ingredients	848,295	100.0
Refrigeration		
Chilled/fresh	824,800	97.2
Frozen	D	D
Other or missing	D	D

D = Results suppressed.

for these processors providing transactions data, AMAs are not a necessary condition for branded programs.

The sales data from meat processors showed that they produced case ready and RTE beef and pork that was sold primarily to retailers. Very little product was sold on the spot market. Over one-third of the pork was priced by negotiation and nearly one-fourth was priced by formula. A few beef sales were priced by negotiation or formula, but more were listed under other or missing.

Comparison of Survey Results and Transactions Data

The survey includes a broad cross section of meat processors while the transactions data comes from the largest meat processors. These two sources of information provide more information than either source alone. However, we note some differences between the meat processor survey results and transactions-level data analyzed from meat processors. Much of this difference can be attributed to samples that represent different companies. The difference is most apparent by looking at the meat products purchased and sold. The survey included 63 firms selling an average of \$15 million of beef and 77 firms selling \$5.5 million of pork. The transactions data included 17 beef firms representing 27% of transactions and 15 pork firms representing 73% of transactions. The survey also included firms processing lamb and combination meat products. In both analyses, beef and pork processors' largest purchases were ground meat and trimmings and RTE products. Firms in the survey certified 30% of their product compared with no certification of product in the transactions data.

The two samples differed by who the customer was. Ninety percent of the transactions records were to retailers. However, the survey results indicate that 41% of sales were to wholesalers and distributors, 29% to food service operators, 21% to retailers, and 8% to other processors and manufacturers.

There is a large difference in purchasing methods between the two samples. The survey indicated that 91% of firms used the spot market to purchase product and 63% used it exclusively. Yet only 25% of the transactions records and 21% of the volume by weight for both beef and pork processors were in the spot market. In turn, the transactions data show more firms use AMAs than the survey indicates, particularly marketing agreements and internal transfers. The methods used by pork processors were dominant in the transactions data because they represented three-fourths of the observations.

The two most common methods used to price meat purchases by processors surveyed were price lists and individually negotiated prices, with approximately 60% of plants using each method. Formula pricing was used by 32% of plants, and 13% of plants used internal transfers. This compares with 11% of transactions records by negotiated pricing and virtually none by price list. Formula pricing was used for 47% of transactions, and internal transfer was used for a much smaller percentage. As with purchasing methods, pricing methods were weighted heavily by pork processors' transactions that had much fewer negotiated and much more internal transfers than did beef processors. Sixty-three percent of surveyed plants using formula pricing reported using a USDA publicly reported price. However, 93% of the transactions data using a formula based it on USDA-reported prices.

Transactions data for product sales were from an even smaller number of firms, 11 in total. The requirement that products must include at least 50% meat to be included in this analysis excluded firms and records. The survey reported that the spot market was used by 60% or more of plants and 10% of plants used forward contracts. The transactions records rarely indicated the sales method used.

Understanding Downstream Linkages

It is important to recognize that individual firms may have a dominant practice for purchases, sales, and pricing that is different from other competing firms. Averaging such firms together may provide an overview of the sector but does not represent any one firm. For example, some processors are wholly owned by a packer, and 100% of their product purchases are internal transfers. Another processor reported 100% of purchases in the spot market using USDA-reported prices in a formula purchase. Still other processors reported all marketing agreement or all forward contract. Although some processors transactions data did reflect a mix of purchasing and/or pricing methods, many were all of one method. This dominant method approach was apparent in the survey data as well. Sixty-three percent of the processors surveyed indicated they used the spot market exclusively. Thus, depending on which processor provided transactions data for purchases or sales, it is not surprising that the data do not match the survey results.

Another explanation for differences between the survey and transactions data besides sampling may be due to human perception versus actual data. The transactions data are factual records of the number and size of actual trades. The data were sent to and summarized by researchers on the project. The survey was mailed to firms to complete on site and return to researchers on the project. We do not know who within the plant completed the survey or what information he or she used to answer the questions. It is possible that a higher level of spot market use reported in the survey is due to the level of activity or work associated with the spot market compared with an ongoing AMA with a customer. Other possible perception versus actual data differences may exist.

2.2 QUALITY DIFFERENCES ASSOCIATED WITH MARKETING ARRANGEMENTS IN THE BEEF INDUSTRY

In this section, we present the results of descriptive analyses on beef quality differences and branded products for different marketing arrangements used by beef packers. The analysis focuses on beef packer purchases of cattle and sales of beef in the production and sale of branded products. Because the beef branded programs often rely on quality grades, (i.e., CAB), the

beef data provides a vehicle to evaluate the relationship between live animal purchases and product sales and the role of AMAs.

One measure of beef quality is the percentage of product that is branded meat products. Presumably, product that represents a company's brand is of higher quality or at least more consistent quality than commodity product. The transactions data were sorted into two categories: plants that sell little branded product (0% to 20%) and plants that sell a moderate amount of branded product (21% to 40%).⁵ No plants reported selling more than 40% of product as branded product. We then compared the cattle-purchasing methods for these two groups of plants. The hypothesis is that AMAs are necessary to secure the higher quality cattle needed for branded product. If so, plants selling more branded product would have a higher percentage of AMAs.

The results are summarized in Tables 2-10 and 2-11. Seventeen plants in the 0% to 20% branded product category purchased 32.4 million cattle in 357,000 lots during the data period. The seven plants in the 21% to 40% branded product category purchased 21.5 million cattle in 178,000 lots.

Table 2-10. Fed Cattle Purchase Transactions Based on Beef Product Branding Categories, October 2002–March 2005

Percentage of Branded Products	Number of Plants	Steers and Heifers		
		Number of Lots	Number of Cattle	Hot Weight (lbs)
0%–20% branded	17	356,948	32,382,229	25,190,641,373
21%–40% branded	7	177,881	21,493,892	16,892,303,828
Total	24	534,829	53,876,121	42,082,945,201

⁵ Matching the timing of cattle slaughter by purchase method with beef sales by sales method at the plant level was not feasible because plants do not maintain their data in such a way that a purchase transaction can be matched to the subsequent multiple sales transactions. The cross-tab analysis provides an aggregate comparison.

Table 2-11. Beef Sales Product Branding, by Type of Cattle Purchase Method (No. of Plants = 24), October 2002–March 2005

Percentage of Branded Products	Type	Fed Cattle Purchase Method							Total
		Auction Barns	Dealers/ Brokers	Direct Trade	Forward Contract	Marketing Agreement	Packer Fed Owned	Other or Missing	
0%–20% branded	No. of lots	D	5,345	186,600	9,003	95,415	D	7,952	356,948
	% of lots		1.5%	52.3%	2.5%	26.7%		2.2%	100.0%
	No. of lbs	D	359,324,298	13,552,944,116	784,573,212	7,318,432,004	D	400,011,106	25,190,641,373
	% of lbs		1.4%	53.8%	3.1%	29.1%		1.6%	100.0%
21%–40% branded	No. of lots	D	0	115,364	9,117	48,229	D	484	177,881
	% of lots		0.0%	64.9%	5.1%	27.1%		0.3%	100.0%
	No. of lbs	D	0	10,444,169,384	936,042,161	4,902,547,745	D	44,624,345	16,892,303,828
	% of lbs			61.8%	5.5%	29.0%		0.3%	100.0%
Total	No. of lots		43,968	301,964	18,120	143,644		27,133	534,829
	% of lots		8.2%	56.5%	3.4%	26.9%		5.0%	100.0%
	No. of lbs		1,864,571,565	23,997,113,500	1,720,615,373	12,220,979,749		2,279,665,014	42,082,945,201
	% of lbs		4.5%	57.0%	4.1%	29.0%		5.4%	100.0%

D = Results suppressed.

The 0% to 20% plants bought a higher percentage of their cattle through auctions and dealers than did the 21% to 40% plants, and they bought a smaller percentage of cattle through direct trade. However, when we combine these three spot market methods and compare them with the three AMA methods, we see no difference in the use of AMAs related to the level of branded product sold. Both types of plants purchased a majority of their cattle on the spot market.

Although the differences were small, the 21% to 40% plants used more forward contracts and less packer ownership than did the 0% to 20% plants. Shares of marketing agreement cattle were nearly identical across the two groups.

Another argument made for using AMAs to buy cattle is to fulfill downstream agreements with customers. To evaluate this claim, we compared cattle purchase methods with beef sales methods (Tables 2-12 and 2-13). Beef plants that specified sales methods were divided into two groups: 0% to 50% cash or spot market beef sales and 51% to 100% cash or spot market beef sales. The 0% to 50% cash group had five plants, 129,000 lots, and 16.0 million cattle purchased. The 51% to 100% group represented nine plants, 169,000 lots, and 18.8 million cattle purchased. Although the 0% to 50% cash group bought a smaller percentage of their needs through auctions and dealers than did the 51% to 100% cash group, they purchased more direct trade cattle. Transactions from both groups indicated they bought equal percentages of their cattle through the spot market. The 0% to 50% cash group used more marketing agreements, and the 51% to 100% cash group had more packer owned cattle. Thus, there was no substantial difference in the use of AMAs compared with spot market purchases based on beef sales methods for the transactions data reviewed.

Table 2-12. Fed Cattle Purchase Transactions Based on Sales Transactions Categories, October 2002–March 2005

% Cash Market Sales	Number of Plants	Steers and Heifers		
		Number of Lots	Number of Cattle	Hot Weight (lbs)
0%–50% cash market	5	128,943	15,980,944	12,584,269,659
51%–100% cash market	9	169,100	18,784,484	14,624,122,186
Not specified	10	236,786	19,110,693	14,874,553,355
Total	24	534,829	53,876,121	42,082,945,201

Table 2-13. Use of AMAs for Cattle Purchases Based on Use of Marketing Arrangements for Beef Sales (No. of Plants = 24), October 2002–March 2005

Percentage of Cash Market Sales	Type	Fed Cattle Purchase Method							Total
		Auction Barns	Dealers/ Brokers	Direct Trade	Forward Contract	Marketing Agreement	Packer Fed Owned	Other or Missing	
0%–50% cash market	No. of lots	D	0	83,463	4,878	39,579	0	D	128,943
	% of lots		0.0%	64.7%	3.8%	30.7%	0.0%		100.0%
	No. of lbs	D	0	7,527,523,134	516,449,199	4,445,851,118	0	D	12,584,269,659
	% of lbs		0.0%	59.8%	4.1%	35.3%	0.0%		100.0%
51%–100% cash market	No. of lots	7,868	D	89,019	6,750	41,712	D	D	169,100
	% of lots	4.7%		52.6%	4.0%	24.7%			100.0%
	No. of lbs	664,458,515	D	8,110,288,479	727,017,575	3,139,671,080	D	D	14,624,122,186
	% of lbs	4.5%		55.5%	5.0%	21.5%			100.0%
Not specified	No. of lots	D	D	129,482	6,492	62,353	3,892	0	236,786
	% of lots			54.7%	2.7%	26.3%	1.6%	0.0%	100.0%
	No. of lbs	D	D	8,359,301,887	477,148,599	4,635,457,551	307,776,269	0	14,874,553,355
	% of lbs			56.2%	3.2%	31.2%	2.1%	0.0%	100.0%
Total	No. of lots	43,968		301,964	18,120	143,644	27,133		534,829
	% of lots	8.2%		56.5%	3.4%	26.9%	5.0%		100.0%
	No. of lbs	1,864,571,565		23,997,113,500	1,720,615,373	12,220,979,749	2,279,665,014		42,082,945,201
	% of lbs	4.5%		57.0%	4.1%	29.0%	5.4%		100.0%

D = Results suppressed.

Finally, the packer transaction data were sorted by beef sales type to determine whether the market outlet influenced the choice of cattle procurement methods. Three categories of beef buyers were identified as low or high volume purchases of beef from packers. These buyer types are meat processors, retailers, and food services. While the differences in the use of spot market and AMA purchases of fed cattle by packers in each buyer type category were not large, they did exist. Packers that sold more beef to meat processors bought fewer cattle on the spot market, but about the same number of cattle through AMAs (with the difference resulting from a larger percentage of other purchases or missing information). Packers that sold a larger amount of beef to retailers bought a larger percentage of their cattle on the spot market and a slightly lower percentage of cattle through AMAs. Finally, packers that sold more beef to food service bought a higher percentage of cattle in the spot market and lower percentage through AMAs. The differences in purchase volumes were approximately 10 percentage points more in the spot market and 10 percentage points less through AMAs. In summary, comparing cattle purchase methods across types of buyers for beef products did not reveal substantial differences. Spot market purchases were near 60% of cattle bought and AMAs represented 35% to 40% of cattle purchased regardless of buyer type.

The cross-tab analysis of aggregate cattle purchase and beef sales data suggests little correlation between quality measures and downstream commitments and the use of AMAs. The motivation and use may be stronger for an individual firm or marketing program. A possible explanation for this weak relationship in the aggregate data may be the nature of the beef industry and the relative size of these programs compared with the total market. For example, the widely recognized Certified Angus Beef (CAB) program is based on product specifications determined at slaughter rather than on process specifications during the animal's lifetime. Only 5 of 43 USDA branded beef programs⁶ have standards beyond what can be determined via visual inspection of the animal or carcass at slaughter. Thus, regardless of how the animal is procured, as long as it and its carcass meet the CAB specifications, it

⁶ See USDA's Agricultural Marketing Service's "Comparison of Certified Beef Programs," updated June 8, 2006, at <http://www.ams.usda.gov/lsg/certprog/industry.htm>.

qualifies for the program. The market share of branded beef is also relatively small. Only 14% to 15% of cattle qualify for CAB, widely recognized as the most successful branded beef. Given the measurable carcass specifications that define a brand and the relatively small portion of beef in branded programs compared with commodity beef, it is more efficient for packers and processors to sort carcasses than it is to produce cattle to meet the specifications.

It should also be noted that most packers sell to a variety of markets. That is, carcasses produce many different products (from steaks to hamburger) and packers buy cattle that vary in levels of quality that cannot be determined until after slaughter. Grid marketing, in AMAs or spot markets, sends price signals to sellers regarding quality and yield grade differences and shares the risk of off-specification carcasses between buyers and sellers. AMAs may help packers narrow the distribution of cattle purchased and more accurately meet the specifications of particular downstream markets, but AMAs cannot predict with certainty the quality grade of cattle. Thus, as long as quality grades and not credence attributes are primary determinants of brand or other downstream market specifications, AMAs will likely not be a necessary condition for quality.

2.3 SUMMARY

We analyzed and compared meat purchase and sales transactions data from meat processors with survey data from downstream users. Seventy-three percent of the product represented in the transactions records was pork and the remainder was beef. Over 40% of the pork and 60% of the beef purchased by these processors was ground (including trimmings) or RTE product, and 100% of the sales were either case-ready or RTE product.

Processors purchased a smaller percentage of their beef and pork on the spot market compared to AMAs. These transactions results have less spot market purchases than was reflected in the survey where 91% of processors used the spot market to purchase meat and 63% used it exclusively.

It was also apparent that processors either do not keep track of the purchase method or do not identify with the categories listed because 39% of the beef processors and 32% of the pork processors recorded the purchase method as “other” or it was

missing. Even fewer processing plants provided usable meat sales data and it represented more beef than pork. Even fewer sales transactions were identified by selling method. Formula pricing, most often based on USDA reported prices, was used in spot market purchases as well as AMAs. Likewise, individually negotiated prices were more common in forward contracts than in spot market transactions.

It was difficult to assess the impact of AMAs on beef quality based on matching beef cattle purchase to beef sales transactions data. However, there appears not to be a relationship between branded product, a measure of quality, and AMA use. Two examples illustrate this point. First, 60% of the beef purchased on the spot market by processors was branded product compared with none through marketing agreements. Second, comparing beef packer cattle purchase methods with beef sales methods shows no difference in spot market use between plants with under 20% or over 20% branded product sales. Thus, AMAs do not appear to be a necessary condition for a branded beef product.

3

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