OLIGOPOLISTS THEN AND NOW: A STUDY OF THE MEATPACKING INDUSTRY

Lori A. Dickes, Lander University
Allen L. Dickes, Washburn University

ABSTRACT

This paper explores the hypothesis that the meat packing industry has had an evolution that, even with public policy changes, continues to push the industry towards an oligopolistic structure (at times monopoly). The firms today, as in years past, continue to be highly motivated by consolidation and integration. The paper will begin by tracing the historical development of the meatpacking industry, the regulatory response to the industry, and finally discuss the literature and current consolidation within the industry. After doing this, the paper hopes to reveal that there is a common thread that runs through the meatpacking industry and that is that economies of scale and cost advantages of integration are the driving force in 2002 just as they were in 1900. It appears that in the case of the meatpacking industry history sometimes repeats itself.

INTRODUCTION

The structure of modern American industry and enterprise has been a topic of popular and academic discussion and an issue of debate among economists and policymakers for nearly 125 years. A.D. Chandler in his classic 1962 study, Strategy and Structure, argues that the unprecedented industrialization of the late 19th century led to industrial enterprises like the U.S. had never before seen. Chandler specifically focuses on firms like

DuPont, General Motors, Standard Oil, and Sears Roebuck and Company. However, Chandler also points to meatpacking as an industry where structure followed strategy. Chandler defines business structure as the organization devised to administer enlarged activities. He concludes that the organizational structure resulted from entrepreneurs planning and administering enterprise growth (Chandler, 1962).

As the nineteenth century closed, firms in railroads, steel, tobacco, sugar refining, oil, explosives, brewing and distilling, agricultural equipment and meatpacking consolidated market power. The structure of major U.S. industries departed rapidly from the classical definition of competition. Beginning in the 1870s, consolidation and integration (both vertical and horizontal) proceeded with dizzying speed and transformed the economy. By the end of the 1890s, oligopoly, virtual monopoly or shared monopoly characterized American industry. In many cases, firms in oligopolistic or monopolistic industries enjoyed economies of scale and scope, along with increased production and lower prices for consumers. However, predatory actions and other negative consequences of market power produced a popular clamor against the trusts. Ida Tarbell, Frank Norris, Upton Sinclair and many others gave voice to this protest.

As protests rose, the demand for public control of big business became a reality. These demands for public restraints on business led to the passage of the Interstate Commerce Act of 1887, the Sherman Anti-Trust Act in 1890 and the Meat Inspection Act of 1891. Later the 1904 prosecution of the Northern Securities Company and the creation of the Bureau of Corporations within the Department of Commerce occurred and were the cornerstones of Theodore Roosevelt's "Trust Busting" policy. The Sherman Act remains today the foundation of United States anti-trust policy. However, neither enforcement nor interpretation of anti-trust law has been consistent over the course of the twentieth century. As well, anti-trust action continued to be in the popular media in the twentieth and now the twenty-first century as concerns over increasing concentration in a variety of industries takes on momentum. Even though this case has now been settled, the decision to pursue monopoly charges against Microsoft is the most publicized recent example.

HYPOTHESIS

This paper explores the hypothesis that the meat packing industry has had an evolution that, even with public policy changes, continues to push the industry towards oligopoly (at times monopoly) and from all appearances will continue to do so. While the firms today are not the same as they were in 1890, 1945, or 1970, they continue to be highly motivated by consolidation and integration. The paper will begin by tracing the historical development of the meatpacking industry, the regulatory response to the industry, and finally discuss the literature and current consolidation within the industry. After doing this, the paper hopes to reveal that there is a common thread that runs through the meatpacking industry and that is that economies of scale and cost advantages of integration are the driving force in 2000 just as they were in 1900.

MEAT PACKING: HISTORICAL DEVELOPMENT AND REGULATION

The meatpacking industry is an interesting case study in industrial organization and governmental response to big business enterprise. The industry has experienced several periods of structural change and consolidation during the past 120 years. Meatpacking was part of each of the great merger waves, the 1890s, 1920s, 1960s and later in the 1970s and 1980s. Each merger wave was significant to the industry and lead to the current structure exhibited today.

In the later half of the nineteenth century, meatpacking firms developed into a national industry, with consolidated control and a changed market structure. Oligopoly (collusive or not) characterized the industry in the twentieth century's first decade. The major firms assumed position among the largest industrial enterprises in the U.S. and world. A changing environment moved the center of the industry westward from the Ohio River Valley to Chicago. The rapid urbanization of the nation, coupled with the growth of herds of animals on the western plains, the extension of the railroads, both trunk line roads to the Eastern cities and roads to the west, and the development of dependable refrigeration, made possible the development of a national market.

Gustavus Swift led the development of the national industry. He moved to Chicago in the mid-1870s and quickly set out to establish a nationwide processing, distributing and marketing organization. His desire to build a major national business enterprise led to vertical consolidation. Swift & Company grew to include stockyard ownership, slaughter, processing, distribution to branch houses, and sales at both the wholesale and retail levels. As the twentieth century began, five firms led the industry with Phillip Armour's, Armour & Co., and Swift & Co. being the largest. Armour & Co. ranked number eight among U.S. industrial firms in 1909 in value of assets; Swift & Co. was number thirteen (Chandler, 1962). The big five controlled almost 100 percent of the refrigerated, dressed beef production in 1906 (Libecap, 1992). Swift and Armour by World War I had added major meatpacking plants in Omaha, St. Joseph, Ft. Worth and other cities, and increased their national market share.

At the national level, the first regulatory response to consolidation in the meatpacking industry came in 1891. The passage of the Meat Inspection Act of 1891 was a product of the fundamental changes that had occurred in the meatpacking industry during the 1870s and 1880s. Libecap contends that the consolidation of market power in the hands of four Chicago meatpackers played a prominent role in the enactment of both the industry specific legislation in 1891 and the Sherman Anti-Trust Act of 1890 (Libecap, 1992). In 1905 the Supreme Court upheld the government's anti-trust pursuit of the "Beef Trust," and used the industry to advance the stream of commerce concept to broaden the scope of anti-trust action. However, the difficulty involved in measuring true concentration within the industry spared the big five the trust busting prosecutions suffered by U.S. Steel and Standard Oil in the twentieth century's second decade. Although, public protest over Upton Sinclair's, The Jungle, helped spur passage of the Meat Inspection Act of 1906. This fictional portrayal brought a genuine desire to rid the industry of abuses.

Concerns over concentration in the industry continued and led Congress to initiate a full-scale investigation of the meatpacking industry after World War II. This oligopolistic structure remained intact throughout the 1950s. In 1959 Armour & Co. and Swift & Co. were among the top 100 U.S. industrial firms based on the value of assets (Chandler, 1962). However, structural change in the industry occurred as union strength waned and technological improvements became available in the 1960s and 1970s. Research by Craypo reveals that union strength peaked in the meatpacking industry during the 1960s and through the mid-1970's (Craypo, 1994). By the early 1970s, 95 percent of hourly workers in multiplant meatpacking plants, operating outside the South, were represented by the United Packing House Workers of America and Amalgamated Meat Cutters Union. However, by 1988 unionization had fallen to approximately half of its 1963 level, and nominal wages in the 1990s fell below the hourly wage in 1960 (Huffman & Miranowski, 1996).

The oligopolist of the first half of the twentieth century became pawns in the wave of conglomeratization that swept the nation in the 1960s and 1970s. This conglomerate merger wave saw unrelated firms and industries joining together in business mergers that had not been seen before. The meatpacking industry, along with agricultural industries in general, was not excluded from this period of conglomerate mergers. Wilson & Co. was bought by LTV, and its assets divided into a meatpacking firm, a sporting goods firm and a pharmaceuticals firm (Brown, 1972). Armour & Co. became the target of Gulf & Western; was acquired first by General Host and later became part of Greyhound (Sobel, 1984).

Research by Ussif and Lambert reveals some of the changes that were occurring in the industry during this time (Ussif & Lambert, 1998). Their research concluded that monopoly power in the meatpacking industry peaked from 1974-1978. This peak corresponded with a period of rapidly increasing per capita beef consumption. In addition, their research reveals that by 1978 the Lerner index in meatpacking was .14. However, in 1979 monopoly power in the meatpacking industry fell sharply and stabilized for a period after 1980. They additionally conclude that monopsony power in the meatpacking industry peaked in 1962 and again in 1973.

A new generation of meatpackers emerged in the 1980s. Armour & Co. and Swift & Co., along with Monfort of Colorado, and a host of processing firms became part of the Omaha-based Con Agra food combine. Iowa Beef Packers, Inc. (IBP) grew from a small firm on the fringe of the national market into one of the largest in the industry. Cargill, the Minneapolis agricultural product firm, moved its Excel meatpacker into a position of prominence. The industry, as the twenty-first century begins, is more concentrated than at any time in the twentieth century. By the 1990s, three major firms ruled the pork and beef industry. They replaced the big five of an earlier time. The three major firms are also oligopsonists (perhaps exercising virtual monopsonistic prerogatives). Thus, as history repeats itself, concerns have arisen about increasing concentration and control within this industry.

The concern over increasing integration in the industry gained momentum in the 1990s leading Congress to once again investigate and attempt to regulate the meatpacking industry. The USDA was ordered, in the early part of the decade, to investigate increasing concentration in meat-packing. Two pieces of legislation were introduced in 1999 aimed at controlling or preventing future mergers and other anti-competitive behavior within the meat industry. One Senate Bill would have temporarily prevented mergers among firms in the grain, livestock, seed, fertilizer and food processing industries. The second Senate proposal would have made it illegal for meatpackers to own livestock. Several Senators argued that the U.S. meat industry once again exhibited characteristics of monopoly power that threatened consumers and other businesses involved. Agriculture Secretary Dan Glickman summed it up when he argued:

> It would be simplistic to say that consolidation, on the whole, is a good or bad thing. Consolidation can lead to more efficient, lower-cost production. But competition is the life-blood of the free enterprise system, and the fewer options available in the marketplace, the less innovative the economy. What's more, we should all be concerned when the trend Toward larger and fewer agricultural operations threatens to drive the small operator out of business. We can't allow a system of agricultural Darwinism to prevail, with the survival of the fittest becoming survival of the largest (USDA Backgrounder, 1999).

The importance of the industry as the twenty-first century begins is demonstrated in part by its scope. The U.S. Meat and poultry industry employs nearly 500,000 workers in 44 states; employing more than aerospace manufacturing, newspaper publishing, radio and television broadcasting, the oil and gas industry and the consumer electronics industry. The industry operates over 2,700 livestock slaughtering plants, which are important in the economies of such states as Kansas, Nebraska, Texas, Iowa, Minnesota, and Virginia. In 1994 meatpackers slaughtered 46 million head of cattle, 9.5 million calves and over 100 million hogs. Red meat production topped 42 million pounds in 1994. As well, the total export value of U.S. meat and related products in 1994 was $9.969 billion (www.meatami.org, 2001).

The foregoing discussion of the historical development of the meatpacking industry and its structure shows both the historical significance of the industry and the continuing importance of the enterprise. However, the question of why the industry quickly became oligopolistic, and is even more concentrated today, remains important. In addition, a significant body of research, A.D. Chandler's Strategy and Structure to name only one, points to the value of addressing this question and analyzing the results across industries (Chandler, 1962).

CONCENTRATION, INTEGRATION AND MARKET STRUCTURE

There has been a significant amount of literature emphasizing the concentration and market power in the meatpacking industry. Many of these studies have focused on statistical analysis measuring concentration and its significance to the industry in recent history. Azzam and Anderson reported, based on earlier studies, that concentration could impact the prices charged and quantities sold by firms. Their research also noted the importance of technological development and firm rivalry on changes within the industry (USDA GIPSA, 1996). Technological changes in this industry have been a major factor in improving cost advantages and economies of scale. From a historical perspective some of the most important technological changes in the meatpacking industry have been: (1.) The development of cellulose casings and skinless hot dogs in the 1920s. (2.) The development of the refrigerated rail car/truck in the 1930-40s. (3.) The development of vacuum packing in the 1950s, and (4.) The development of boxed beef in the 1960s. These changes, along with changes in Federal regulations and anti-trust laws, have allowed for significant structural changes in the meatpacking industry (Food Engineering, 2000).

As these technologies improved, beef processing moved from large cities like Chicago in the 1920s to small cities such as Garden City and Dodge City, Kansas, and Dakota City and Schuyler, Nebraska. The move to towns and cities in rural America was designed to replace outmoded plants with new specialized facilities closer to supplies, and provided the added benefit of lower labor costs. Huffman and Mirankowski confirm that concentration in large specialized operations occurred as refrigeration, processing and packaging for meat improved (Huffman & Miranowski, 1996). Moreover, Ollinger, MacDonald, Handy and Nelson confirm that in the twenty-five years from 1967 to 1992, the meatpacking industry experienced a general shift to greater plant scale (Ollinger, MacDonald, Handy & Nelson, 1996). Looking back on all of these developments there is general agreement in the research that the livestock/meat industry has witnessed substantial changes in production processes and industry concentration (Khan & Helmers, 1997).

Barkema, Drabenstott, and Novak argue that today's changing consumer demand, along with efforts to trim costs across the industry is driving consolidation in meat processing (Barkema, Drabenstott, & Novak, 2001). They contend that profit margins in the beef and pork industries have been eroded by increased competition from a highly concentrated poultry industry. This pressure on the beef and pork industries results from one of the basic tenets of Supply and Demand. As the demand for poultry increases, a substitute product for beef and pork, more pressure is placed on the beef and pork industry to consolidate and find cost-saving measures. Additional research confirms that changes in consumer demand have been a significant factor in the recent structural transformation of the meat industry (Bastian, Bailey, Menkhaus, & Glover, 1994).

Risk aversion is the focus of Khan and Helmers discussion of vertical integration in the beef industry. They conclude that: (1.) Improved efficiency, (2.) Reduced uncertainty of input and output prices and, (3.) Reductions in operations cost have moved the firms in the industry to increased vertical integration (Khan & Helmers, 1997). At the same time, Featherstone and Sherrick cite the integrated firm's ability to gain market advantage, increase efficiencies, reduce uncertainty and gain cost advantages (Featherstone & Sherrick, 1992). Additional research focuses on the idea of "captive supplies" and suggests that backward integration can produce efficiency gains and reduce a firm's acquisition price for externally supplied raw inputs (Love & Burton, 1997).

It is apparent that the meatpacking industry has undergone a number of structural changes in the twentieth century. One way to define structural change is change in the number and/or size of firms in an industry (Bastian, Bailey, Menkhaus, & Glover, 1994). The number of firms in the meatpacking industry declined in the late nineteenth century while the size of firms increased dramatically. This process has occurred again in the late years of the twentieth century. Structural change is not limited to the above definition and can include many other variables including location, extent of unionization, and level of horizontal and vertical integration. Each of these has been a part of the evolving structure of the industry over its entire history and certainly over the past thirty years.

Within the industry one of the easiest ways to measure degrees of monopoly power, or divergence from perfect competition, is to examine concentration ratios. Admittedly, concentration ratios have several limitations. For example, some industries appear to have low concentration levels nationally, but in fact exert significant market control locally and/or regionally. As well, industries can exhibit high degrees of concentration even though the four or eight largest firms have significant levels of interfirm competition. Despite these limitations, concentration ratios are an important tool of analysis in determining the level of monopoly power in an industry or market.

Table One, on the following page, presents initial data on the concentration ratios within the meatpacking industry. SIC (Standard Industrial Classification Index) codes 2011 and 2013 represent several different categories of meat industrial firms including canned meats, meat extracts, and meatpacking plants. As the data indicates, SIC firms classified under 2011 have much higher concentration ratios than those under 2013. SIC code 2011 includes meatpacking firms. Based on these figures, it can be argued that this industry exhibits at least a moderate measure of concentration. This is further supported by the data which reveals that this industry has almost 1300 firms, of which the eight largest firms account for less than 1 percent of this total but account for 66 percent of the value of shipments.

Table I: Concentration Ratios by SIC Code

SIC Code	Number of Companies	Shipments Millions $	Percentage of Value of Shipments Accounted for by Largest Firms			
			4	**8**	**20**	**50**
2011	1296	6958.7	50	66	79	88
2013	1128	5478.3	25	33	46	62

Source: U.S. Census Bureau. Manufacturing Concentration Ratios. Economic Census, 1992.

Table Two, below, looks specifically at the beef packing industry. Overall, the trend from 1980 to 1995 is increasing concentration. In fifteen years, significant increases in four firm concentration ratios have been exhibited in the steer/heifer, cow/bull, cattle and boxed beef segments of the beef industry. In fact these four firm concentration ratios have been climbing since the early 1960s. For instance, the four firm concentration ratios in beef slaughter were 26 and 25 for 1967 and 1977 respectively (Ollinger, MacDonald, Handy & Nelson, 1996). By 1995 the four firm concentration ratios were 79.3, 23.5, 67.3 and 84.3 respectively in the steer/heifer, cow/bull, cattle and boxed fed beef markets. This establishes that not only is there moderate to substantial concentration in the industry, but that concentration has been increasing.

Table 2: Four-Firm Concentrations: Beef Packing				
Year	Steer/Heifer	Cow/Bull	Cattle	Boxed Fed Beef
1980	35.7	9.7	28.4	52.9
1985	50.2	17.2	39	61.5
1987	67.1	20	54.2	79.5
1990	71.6	20.4	58.6	79.3
1993	79.8	24	66	82.7
1994	80.9	26.3	67.8	85.7
1995	79.3	23.5	67.3	84.3

Source: U.S. Department of Agriculture, Packers and Stockyards Statistical Report: 1995 Reporting Year, GIPSA 97-1, September 1997, Tables 27, 28, and 29.

The Herfindahl-Hirshman Index (HHI) is another useful measure of concentration and overcomes many weaknesses of the concentration ratio measurement. This measurement is considered superior to concentration ratios because it takes into account the number of firms and the relative distributional shares of the market held by all firms, not just the largest. The HHI is calculated by taking the sum of the squares of each firm's percentage share of the market. Thus, if 200 firms have a 1-percent share, the HHI will equal 200. If 1 firm has 100 percent of the market, the HHI equals 10,000. The Department of Justice and Federal Trade Commission have set guidelines using the HHI to determine whether mergers in an industry will have anti-competitive results. Below, Table Three reveals the guidelines set by the Department of Justice and the Federal Trade Commission. The basic guidelines set by these agencies reveal that both for moderate and high concentration industries there are potential competitive concerns when mergers occur.

TABLE 3: DOJ and FTC Merger Guidelines	
Post-Merger HHI below 1,000	This is considered unconcentrated
Post-Merger HHI between 1,000-1,800	This is considered moderately concentrated
Post Merger HHI above 1,800	This is considered highly concentrated
Source: USDA, Concentration Measures for the Beef Packing Industry. TB-1874, 1996.	

The HHIs illustrated in Table Four reveal the significant increase in market concentration that has occurred in the beef-packing industry over the fifteen-year period from 1980-1995. All segments of the beef-packing industry have exhibited a significant increase, with Steer/Heifer, Cow/Bull, and Cattle exhibiting the largest percentage change in the HHI. (See Table IV below.). The HHI for the Steer/Heifer and Boxed Beef segments indicate a level of concentration such that the Department of Commerce would likely deny a request for further mergers within that segment of the industry. As well, the Cow/Bull segment would be considered moderately concentrated and would warrant further research. In 1995 216 plants slaughtered 27 million heads of steers and heifers. The vast majority (80%) were slaughtered in 22 plants. The same was true for cows and bulls; 71% of the 6.5 million cows and bulls were slaughtered at 26 plants (USDA Packers and Stockyards Statistical Report, 1995).

If Philip Armour came back today to see his industry he would revel in the changed technology and production methods. However, the number of competitors in the industry would not surprise him. He would possibly only be surprised by their names. In 1890, Armour, Swift, Morris and Hammond, the 4 largest Chicago meatpackers, slaughtered 89 percent of the cattle in Chicago and by 1904 these firms controlled 50 percent of the national meatpacking market (Libecap, 1992). In order to maintain and improve this market share the Chicago meatpackers were entrepreneurs in the use of refrigeration and large centralized slaughterhouses. By 1917, the major Chicago packers controlled 93 percent of the total U.S. market for the storage and distribution of dressed beef, as well as refrigerator cars to transport the beef around the country (Libecap, 1992). By several estimates, the U.S. meat industry was the first or second most valuable U.S. industry for the thirty-year period, from 1880-1910. While the meat industry today is certainly not the most valuable U.S. industry, it is still significant and more importantly, provides commodities that consumers need and want. Meatpackers today, as those before them, have been able to increase their market share through changes in technology, plant scale, and merger activity. As a result, the four largest firms across the different sectors of beef packing control between 24 percent and over 80 percent of their respective markets. Thus, just as in 1910, this industry is characterized by its high levels of concentration with a few large firms controlling the market.

Table 4: Herfindahl-Hirshman Index

Year	Steer/Heifer	Cow/Bull	Cattle	Boxed Fed Beef
1980	561	89	361	1,220
1985	999	160	617	1,527
1987	1,435	206	946	1,981
1990	1,661	223	1,118	1,988
1993	2,052	276	1,393	2,236
1994	2,096	320	1,460	2,340
1995	1,982	293	1,437	2,208

Source: U.S. Department of Agriculture, Packers and Stockyards Statistical Report: 1995 Reporting Year, GIPSA 97-1, September 1997, Tables 27, 28, and 29.

CONCLUSION

It is acknowledged that all firms across all industries seek to minimize cost and improve their market share. This is an enduring feature of our capitalist economy and the drive for profits. However, this research reveals the possibility that some industries may experience this pressure to a greater extent than others may. If this is the case, then some industries may have a natural drive or push towards oligopoly and monopoly structure.

Meatpacking was a significant national industry as the twentieth century began and remains a major economic force at the start of the twenty-first century. In 1900 concentration, vertical integration and oligopoly characterized the industry. The structure of the industry in 2002 also features concentration, vertical integration and oligopoly. In fact, the level of concentration has increased. The industry's structure then and now has been driven by a national market strategy, by the necessity to minimize costs, and an aversion to risks. As well, firms within the industry continue to pursue economies of scale and scope. It appears that in the case of the meatpacking industry, especially beef and pork, history sometimes repeats itself.

REFERENCES

Anderson W.A., B.C Murray, J.L. Teague & R.C. Lindrooth. (1998). Exit from meatpacking industry: A microdata analysis. *American Journal of Agricultural Economics, 80*(1), 96-107.

Barkema, A., M. Drabenstott & N. Novack. (2001). The new U.S. meat industry. *Federal Reserve Bank of Kansas City, Economic Review, 86*(2), 33-56.

Bastian C., D Bailey, D.J. Menkhaus & T.F. Glover. (n.d.). Today's changing meat industry and tomorrows beef sector. Department of Agriculture and Resource Economics, University of Arizona. Retrieved May 2001, from http://ag.arizona.edu/ext/wemc/papers/Today_Tomorrows.html.

Bhuyan, S. & R.A. Lopez. (1997). Oligopoly power in the food and tobacco industries. *American Journal of Agricultural Economics, 79*(3), 1035-1046.

Chandler, A.D. (1962). *Strategy and Structure*. Cambridge, MA: MIT Press.

Craypo, C. (1994). Meat packing: Industry restructuring and union decline. *Contemporary Collection Bargaining in the Private Sector, Industrial Relation Research Series*, 63-96.

Featherstone, A.M. & B.J. Sherrick. (1992). Financing vertically coordinated agricultural firms. *American Journal of Agricultural Economics, 74*(5), 1232-1238.

Hedgers, S. J., D. Hawkins & P. Loeb. (1996, September). The new jungle. *U.S. News and World Report,* 34-46.

Huffman W.E. & J.A. Miranowski. (1996). Immigration, Meat Packing, and Trade: Implications for Iowa. Staff Paper Iowa State University #285, December 1996.

Khan M. A. & G. A. Helmers. (July, 1997). Causality, Input Price Variability, and Structural Changes in the U.S. Livestock-Meat Industry. Presented to the Western Economics Association Meeting, Reno, Nevada.

Libecap, G. D. (1992). The rise of the Chicago packers and the origins of the meat inspection and antitrust. *Economic Inquiry, 30*(2), 242- 260.

Love H.A. & D. M. Burton. (1996). A Rationale for Captive Supplies. Proceedings of NE-165 Conference. Food Marketing Policy Center, University of Connecticut, 23-37.

Meat Packaging Device Simplifies Process (1991). *Chilton's Food Engineering, 63*(11), 63-64.

New GIPSA Report Identifies Trends in Beef Cattle Feeding, Packing Segments (2001). *Feedstuffs, 73*(30), 88-11.

Ollinger, M., J.M. MacDonald, C.R. Handy & K.E. Nelson. (1996). The Structural Change in the U.S. Meat and Poultry Industries. Proceedings of NE-165 Conference. U.S. Department of Agriculture, Economic Research Service, 3-21.

Purcell, W.D. (1990). Economics of consolidation in the beef sector: Research challenges. *American Journal of Agricultural Economics, 72*, 1210-18.

Schroeter, J. R., A.M. Azzam & M. Zhang. (2000). Measuring market power in bilateral oligopoly: The wholesale market for beef. *Southern Economic Journal, 66*, 526-551.

Sobel, R. (1984). *The Rise and Fall of the Conglomerate Kings.* New York, NY: Stein and Day Publishing.

Sperber, B. (1993). Plant Expansions follow industry trends, new business deals. *Food Processing, 54*, 31-46.

Ten events that shook the beef and poultry worlds (2000). *Food Engineering, 72,* 24-25.

Ussif A.A. & D.L. Lambert. (August, 1998). Testing for Noncompetitive Behavior in the U.S. Food Industry. Presented to the Annual Meeting of the American Agricultural Economics Association, Salt Lake City, Utah.

United States Bureau of the Census (1992). Concentration Ratios in Manufacturing. Census of Manufactures report MC92-S-2, 1992.

United States Department of Agriculture (USDA) Economics Research Service. Concentration Measures for the Beef Packing Industry, TB-1874, 1996.

www.alliedacademies.org

www.alliedacademies.org