AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

NEWP

W.P.-16

GIANNINI FOUNDATION OF
AGRICULTURAL ECONOMICS
LIBRARY
WITHDRAWN
OCT 30 1989

NE-165

PRIVATE STRATEGIES, PUBLIC POLICIES & FOOD SYSTEM PERFORMANCE

CONCENTRATION ISSUES

IN THE

U.S. BEEF SUBSECTOR

WP-16 September 1989

WORKING PAPER SERIES

A Joint USDA Land Grant University Research Project

CONCENTRATION ISSUES

IN THE

U.S. BEEF SUBSECTOR

WP-16 September 1989

This working paper was originally prepared as one chapter in a report commissioned by the Concentration/Integration Task Force of the National Cattlemen's Association. The full report is by D. Gale Johnson, John M. Connor, Timothy Josling, Andrew Schmitz, and G. Edward Schuh and is entitled Competitive Issues in the Beef Sector: Can Beef Compete in the 1990s? (Minneapolis, MN: The Hubert H. Humphrey Institute of Public Affairs, University of Minnesota, September 1989.) The author is grateful for comments received from his co-authors and members of the Task Force. He also wishes to acknowledge the invaluable assistance of John Rose, graduate research assistant in the Department of Agricultural Economics, Purdue University.

CONTENTS

	Page
A. Objective and Framework	1
B. Market Definitions	4
Product Scope	4
Geographic Scope	7
International Trade and Investment	8
Excess Capacity	12
Vertical Subsector Organization	13
Summary	16
C. Market Concentration	17
Beef Producer Concentration	18
Meatpacker Concentration	19
Meat Wholesaler Concentration	28
D. Product Differentiation	30
E. Economies of Scale and Other Barriers to Entry	33
Changing Concentration	36
F. Market Structure and Market Power	38
Producer Level	38
Meatpacker Procurement	39
Selling Prices of Meatpackers	44
Meatpacker Margins	45
Meatpacker Returns	47
G. Competition Policy	47
Continued Laissez-Faire	49
Cooperative Organization	50
Rigorous Enforcement of Antitrust Laws	50
Increased Market Legislation	51
References	53

CONCENTRATION ISSUES IN THE U.S. BEEF SUBSECTOR

A. Objective and Framework

The principal issue to be addressed in this part is whether the changing concentration of ownership and decision making within the various functional levels of the beef subsector has altered the competitiveness of any of the levels or the subsector as a whole. Each of these terms needs to be defined.

The term concentration as used here is broadly synonymous with the terms "business organization" or "market structure," the latter being generally preferred by economists. By market structure we mean those relatively unalterable characteristics of markets that can confer on market participants (buyers or sellers) some discretion over pricing or output levels. It is conventional to distinguish three elements or dimensions of "imperfect" market structure, namely, market concentration, product differentiation, and the conditions of market entry or exit. Economic theory and empirical observation have shown that each of the three elements of market structure can affect the pricing or output behavior of buyers or sellers in a market, at least in the short run. That is, imperfectly structured markets can generate market power -- the control over price or entry conditions.

Market concentration in its narrow sense (to be used hereafter) is the number and size distribution of buyers or sellers in a given market. When the numbers are large and fairly equal in size, the market is said to be "atomistic." When the numbers are small or very unequal in size, the market is termed concentrated or oligopolistic. A market with only one seller is a monopoly; with one buyer, it is a monopsony. Exactly what constitutes a concentrated market is a measurement issue that will be discussed in Section V.D. below. In general, levels of concentration tend to be quite stable, moving only a few percentage points during a period of five or ten years.

Product differentiation refers to the extent to which some products offered by different sellers are regarded as distinctly and consistently superior to other products in the same market by buyers. The differences of interest rest less on the physical quality differences among products than on perceptions of reputation, reliability, or less tangible images often associated with brands, trademarks, and imperfect buyer information. Physical quality differences such as color, ingredient proportions, or durability are objectively measurable; indeed, grading systems exist precisely to remove most important within-grade quality differences. Undifferentiated product markets are called homogeneous.

Barriers to market entry is the third dimension of market structure. Entry is considered "free" when potential entrants have access to the same or lower-cost production techniques as established sellers, when the creation of new productive capacity at an optimal scale is negligible (or financing the investment is easily available at the same or lower interest rates charged to established firms in the market), and when entry can occur practically overnight. Free entry also requires that the incumbent sellers in the market will not take aggressive actions to prevent or slow new firms from entering the market; that is, the incumbent firms must ignore or act passively in the face of entry. Finally, entry is free only if, after entering, a new seller finds that exit from the market is also costless and instantaneous; that is firms that desire to leave a market find that their fixed investments are not sunk costs and can be fully salvaged. If any of these conditions are not met, entry is said to be blockaded (if fully effective) or forestalled (if simply slowed). The existence of barriers to entry permits sellers to pursue long-run pricing and output strategies; without barriers, firms in highly concentrated industries can follow noncompetitive strategies only in the short run out of fear that they will attract so many new competitors as to make noncompetitive strategies infeasible.

The importance of market structure is in the quality of the resulting performance of the market. When markets are atomistic, products are homogeneous, and entry free, then it is known that the market is going to perform well. That is, perfectly structured markets yield equilibrium prices that respond only to the forces of consumer demand and industry costs of production and distribution. Prices are just high enough to reward sellers with normal profits (adjusted for the riskiness of the business and averaged over a number of years). Technological progress is as rapid as innovation possibilities will allow.

However, if one or more of the market-structure dimensions significantly departs from the competitive ideal there is a tendency for monopolistic practices to develop in the industry. If successful, such practices will lead to reduced output and selling prices above the expected competitive equilibrium price. If directed on the buying side of an industry's operations, monopsonistic practices will force down the prices paid to input suppliers to below the expected equilibrium price. Either pricing strategy will result in widening industry margins and, hence, profit rates above normal rates of return (adjusted for risk and over time). Supranormal selling prices (subnormal input prices) become a device for transferring income from product buyers to product sellers (or from input suppliers to input buyers).

It is in this sense that monopolistic pricing is "unfair." Not only do prices become distorted and cause some buyers to switch their purchases to inferior substitutes, but also those buyers who continue to purchase the product at the enhanced price end up paying a premium to the owners of the monopoly. Quantitative studies of several monopolistic industries confirm that the latter amount (the income transfer) is many times larger than the lost consumption and production (the so-called dead-weight loss).

Thus, we may restate the principal issue in more precise terms. <u>Is the market structure at any functional level of the beef subsector so imperfect</u>

that it has conferred market power on some group of sellers (or buyers)? Recall that market power is the ability (if not the actual wielding) to exercise some discretion over buying or selling prices; it is also the power to exclude would-be sellers from entering a market. This concept is both the economic and legal definition of market power.

We shortly turn to an examination of the facts concerning the levels of market concentration, product differentiation, and ease of market entry. The next-to-last section summarizes and assesses economic studies of market power relevant to the beef subsector. Finally, alternative policy scenarios are addressed. But first we digress on the essential matter of proper market and industry definitions.

B. Market Definitions

A market consists of two sides, the sellers (the industry) and the buyers (the customers or demand segments served). All sellers of the same product and all buyers of the same product are in the same market. The problem at hand is delineating what "the same" means in the context of beef. To properly delineate a market's boundary, one must examine both the selling side and buying side simultaneously.

Product Scope

We reviewed existing studies of the demand for red meats and beef in particular (Huang). It was found that beef was to some degree substitutable for other high-protein foods. Pork, veal, lamb, and chicken are moderately substitutable for beef, whereas fish, eggs, dairy products, and other high-protein foods are poor substitutes. Within the beef products category, fresh (frozen or refrigerated cuts) beef is not substitutable for processed (salted or smoked) meats, even though many processed meats are wholly or partially beef in content. Similarly, beef "varietal meats" and, of course, nonedible

beef by-products are considered very poor substitutes for fresh beef by consumers.

While the findings on the demand side are sensible and well documented, there is more judgment required for considering substitutability on the supply side. Moreover, the appropriate market definitions appear to vary according to which stage of the beef subsector we are considering.

At the producer and feedlot level, beef-cattle raising is fairly well defined. There are few alternative animal enterprises for cattlemen in the West who pasture their animals (except perhaps sheep or buffalo). Beef cattle enterprises in the Corn Belt have more alternatives, including veal, hog, dairy, and poultry raising. However, these alternatives today are accompanied by substantial real asset fixity that militates against rapid changes in product mix in response to product price changes. Culled cows, both spent dairy cows and from cow-calf operations, appear to be distinct products at the producer level.

At the processor level, the Census Bureau places meatpacking plants (SIC 2011) in a separate industry from meat processing plants (SIC 2014). Both of these industries have high specialization (97 to 98% in recent years) and coverage (61% to 86%) ratios. For example, in 1982 meatpacking plants' shipments consisted 98% by value of meatpacking products (the specialization ratio) and 85% of all meatpacking products were made in meatpacking plants (coverage ratio).

However, within the meatpacking industry, the Census Bureau identifies ten classes of meatpacking products: fresh beef, veal, lamb and mutton, pork, lard, and so forth. In the 1982 Census of Manufactures, only 30% of the 1,780 meatpacking plants counted were primarily shipping products in only one of the ten product classes. The remainder were what we will call multi-species plants are quite small. In the case of beefpacking, the 225 meatpacking plants most specialized in beef slaughter accounted for nearly all the beef

shipped in 1982. Thus, specialized beefpacking plants in the aggregate produce only a negligible amount of pork, and vice-versa.

The Packers and Stockyards Administration (P&SA) of USDA has for many years distinguished between steer-heifer and cow-bull beefpacking plants. (Veal, pork, and lamb slaughtering have also been treated separately.) Not only are these plants specialized as to equipment, but they are also geographically somewhat specialized. Cow-bull slaughter is found more widely wherever a state has dairy operations; large steer-heifer plants are found primarily in the Western Corn Belt and High Plains states. On the basis of this and other evidence, it appears that for the vast bulk of beefpacking, there is very little scope for supply substitution between cow-bull and steer-heifer slaughter. The fact that nearly all culled cow meat is sold for further processing into sausage products and little beef from younger animals (mostly tougher muscle) finds its way to sausage plants reinforces this distinction.

A more recent distinction, made in P & S publications since the late 1970s, is the partitioning of steer-heifer slaughter into boxed beef and carcass beef. The proportion of all beef sold as boxed beef rose from 30% in 1972 to 82% in 1988. Some industry analysts expect carcass beef to practically disappear during the 1990s. The question for us is whether boxed beef is a separate market from carcass beef. Both the technology of production and demand characteristics appear to support the affirmative. Although it is possible to produce boxed beef in conventional carcass plants, nearly all is made in separate "fabricating" plants that were built since 1960. In some cases, fabricating plants stand alone, relying on carcasses from slaughtering plants within 100 miles or so, while in other cases fabricating plants were built adjacent to large steer-heifer slaughtering plants that provide a large share of the carcasses needed for further processing. In either case, the type of equipment used and labor requirements imply that conversion of fabricating plants into slaughtering facilities is unlikely to be economically feasible.

Asset fixity at the distribution stage of the beef subsector further reinforces the distinctiveness of boxed beef from carcass beef. The conversion of grocery stores' meatcutting facilities to boxed beef meant that the number and skills of butchers was substantially reduced; in-store carcass handling equipment was discarded; and space needed for carcass cutting was converted to other uses. Once wedded to boxed beef, retailers would find the change nearly irreversible. Thus, arguments on both the demand side and the supply side support treating boxed and carcass beef as separate industries.

At the distribution level of the beef subsector, there appear to be at least four distinct marketing channels: retail food stores, commercial and institutional food-service, government procurement, and exports. Methods of contracting or bargaining differ considerably among the four channels. In this report, we focus mainly on the food store channel, which accounts for about 80% of the manufacturer's value of U.S. beef.

Geographic Scope

In addition to product characteristics, proper market delineation must consider the geographic scope of a market as well. This is a critical consideration because several data series are available only for the United States, whereas at some stages beef markets are subnational.

Feeder cattle are sold primarily at local markets located no more than 200 miles from the ranches on which they were raised. Fed cattle are sold primarily to order buyers from nearby meatpacking plants. The order buyers purchase 80% of their live animals on average 150 miles from the plains states meatpacking plants they represent (and only 135 miles from Midwestern plants). Therefore, the geographic boundaries for live animal sales typically extend no more than 200 miles from the point of production or processing, with the exact location and shape influenced by major transportation routes, transportation

barriers such as mountain ranges, political boundaries, and centers of commerce and price information (e.g., Omaha, Denver, etc.).

Boxed beef and carcass beef is sold essentially on a national basis to food stores and meat wholesalers, though the Rocky Mountains create a semi-permeable barrier to east-west trading of fresh and frozen beef. The boundaries of the beef export market are supranational.

International Trade and Investment

To this point, the U.S. beef industry has been discussed as though it were isolated from the rest of the world. However, both international trade and international direct investment can alter the geographic boundaries of markets.

Imports of fresh and frozen beef have accounted for from 5% to 9% of the U.S. supply of beef since the early 1970s (Connor 1988:Appendix Table A-14). There is no upward trend in imports. These imports often consist of canned or frozen grass-fed beef that may not compete directly with the fresh grain-fed beef used in boxed beef. As mentioned in Chapter IV of this report, beef imports are effectively limited by voluntary export agreements, tariffs, and sometimes quotas. So long as U.S. protectionism continues, domestic competition is hardly affected by import competition. The beefpacking concentration data discussed below are overstated by at most 5% because of beef imports.

Exports can also affect the proper measurement of domestic concentration. If the leading firms export a greater share of their domestic production than do nonleading firms, national concentration data are overstated. Both smaller and larger packers are engaged in exports. Evidence from a USDA survey of U.S. food processors is that smaller firms are more export oriented (Handy and MacDonald 1989). Moreover, much of the exports of beef from the U.S. consists of variety meats and pet food ingredients, products that do not compete with grain-fed boxed beef. The amount of beef exported from the U.S. is large

($1,205 million in 1988), but at most 3% of the value of beef shipped from U.S. plants has been exported in the 1980s (Connor 1988:Appendix Table A-15; USDA 1989). The export ratio has risen from about 1% in 1970-1972. Therefore, the likely impact of exports on domestic competition and concentration may be dismissed as negligible so long as protectionist policies of importing countries remain in place.

A major development since World War II has been the accelerating foreign direct investment involving the U.S. economy. Quantitatively, foreign investment has become a greater source of economic internationalization than trade. Foreign investment has the potential for altering the strategic conduct of firms and, hence, the competitive performance of industries.

Let us first examine foreign investment by U.S.-owned firms abroad -- so-called outward investment. This kind of foreign involvement began over a hundred years ago. Probably the first food company to invest abroad was a condensed milk enterprise in the 1870s called Anglo-Swiss Milk Co., ironically one of the predecessor companies of the world's largest food processing company, Nestlé, S.A. The first large-scale food processing investments abroad were by the leading U.S. meatpackers. Beginning in 1907, the big meatpackers made substantial investments in Argentina, Brazil, Uruguay, Paraguay, Australia, and New Zealand (Horst 1974), mainly to serve the U.K. export trade. By 1915 Swift had 15% of its assets abroad.

By 1986 (the latest, preliminary data available) U.S. companies owned 17,000 foreign affiliates (subsidiaries or joint ventures) which employed over 6 million people. About 40% of all such assets abroad involve manufacturing operations, of which about 8% is in food manufacturing. U.S. multinationals had only 24 meat processing affiliates abroad in 1986, with total assets of $1.2 billion and sales of $2.5 billion. U.S. meatpacking and meat processing firms derive less than 4% of their total sales from plants located abroad, a far smaller proportion than the rest of food manufacturing (15%). Therefore,

on the basis of both export sales (3%) and other overseas sales (4%), the degree of internationalization for U.S. meat companies is relatively small and has likely declined since the earlier part of this century.

Of somewhat more popular concern is the rapid rate at which U.S. assets have been purchased by foreign investors. Several spectacularly large take-overs of large U.S. food manufacturing companies have occurred during the last decade (Carnation by Nestlé, Pillsbury by Grand Metropolitan, and others). Accomplished almost entirely by merger, foreign entry has pushed up the value of their investments in U.S. food processing by 790% during the ten years from 1977 to 1987. In 1986 there were 142 foreign-owned food processing affiliates with $21 billion in total assets, $22 billion in sales, and 162,000 employees. Most of the affiliates were engaged in the manufacture of highly processed consumer packaged foods and beverages. Meat processing affiliates were a small portion of the total, only 10 in number, with $0.6 billion in assets, $1.2 billion in sales, and 4,500 employees. Unlike other areas of food manufacturing, foreign-owned meat processors are contracting; for example, employment since 1980 has shrunk by 85%.

Another point of contrast is profitability of foreign operations. The "profits" of foreign subsidiaries is properly termed direct investment income; it is the distributed and reinvested earnings (net return on equity investment), plus interest paid on long-term debt owed to the foreign parents, less local withholding taxes on earnings or interest. U.S. investments in food processing abroad tended to be more profitable than domestic operations; in 1986, for example, profits were 5.3% of sales. Meat processing affiliates abroad had lower profitability (2.5%), but still above domestic levels. The U.S. food processing affiliates of foreign multinationals, on the other hand, were much less profitable, averaging 1.8% on sales in 1986 and meat affiliates even lower than that.

Most U.S. investment abroad is located in Europe (46% of 1986 assets), Latin America (17%), and Canada (14%). Japan is a distant fourth place with 9%, but that share is rising rapidly (from only 6% in 1982). Food processing outward investments follow a similar pattern, except that U.S.-owned Japanese affiliates accounted for only 6% of food processing investment in 1982 and 1986.

Most inward investment originates from Europe, Canada, and Japan. In the U.S. food processing industries, almost all foreign investment was from Europe (60% of total assets in the 1980s) and Canada (33%). The dollar value of Japanese ownership in U.S. food processing rose slightly in the 1980s, but its share of the total fell from 4% in 1980 to 2% in 1986. Ownership of U.S. meat processors by Japanese investors is similarly modest, about 5 to 6% of all foreign investment in U.S. meat companies (compared to over 80% by European investors), amounting to about $25 million in total assets today (less than 1% of the industry total). In the case of foreign-owned agricultural land (farm and forest), Europeans own 38%, Canadians 28%, and Japanese 3%.

The economic power of Japan and its interest in the U.S. as a source of food will doubtless lead to substantial increases in investments in U.S. companies. Preliminary 1987 data show that Japanese-owned nonbank assets in the U.S. increased to $196 billion, a one-year increase of 99.6%, making Japan the largest single country of foreign ownership. However, Japanese direct investments in the U.S. is so far only what would be expected given its share of non-U.S. world GNP. The $98 billion in Japanese-owned nonbank U.S. assets in 1986 were located primarily in wholesale trade ($39 billion), finance ($36 billion), manufacturing ($11 billion), and real estate ($6 billion). Food and agricultural investments account for less than 5% of total Japanese investment, and most of it is raw farm product wholesaling. Japanese investment in agriculture (including feedlots) amounted to only $82 million in 1986. Out of the 15 million acres of all types of U.S. land owned by foreigners (0.7% of

total U.S. land area), Japanese investors reported owning only 116,000 acres, though recent purchases reported in the trade press will likely increase that amount. At the end of 1988, USDA reported that foreign companies and persons owned 5.1 million acres of U.S. farmland and forest; of that, Japanese investors owned 146,600 acres (3%).*

There is little evidence that foreign investors follow maverick business strategies. Except for a tendency toward low profitability, foreign investors generally play by the local rules, blend in with their domestic competitors, and do little to shake the boat. Japanese investors would appear to be imitating this pattern. Their primary interest in the U.S. is in ensuring a supply of grains, oilseeds, and meat for the Japanese market. Their foreign investment has been primarily in agricultural products wholesaling ($3 billion in U.S. assets generating $8 billion in U.S. exports) rather than food processing.

Excess Capacity

Another consideration in proper market delineation is the issue of excess capacity. If reasonably efficient plants are temporarily closed and can be restarted quickly, their capacity must be considered part of the potential sales size of the market. Similarly, if plants are running with single shifts and labor market conditions permit adding a second shift fairly readily, then that too is regarded as part of the excess capacity of the industry. In other words, market size consists of actual sales plus excess capacity.

Excess capacity can affect the proper measurement of concentration. For example, if the top four producers control 60% of sales in an industry and

---

* In 1988, U.S. companies that were 10% or more owned by foreign residents owned an additional 7.4 million acres of agricultural land. The total of 12.5 million acres that is foreign-owned represents about 0.7% of U.S. agricultural land; Japanese ownership totaled 218,000 acres.

there is 25% idle capacity among the firms below the top four, then actual concentration is 50%. If, on the other hand, idle capacity is spread proportionately between leading and nonleading firms, then concentration ratios based on sales are not affected by excess capacity. As far as is known, the latter is the case in beefpacking.

Vertical Subsector Organization

One final consideration in proper market delineation is vertical subsector organization. To what extent are the functional stages of the beef subsector connected by market or nonmarket linkages. The two primary nonmarket coordinating mechanisms to be discussed are vertical integration (the common ownership of two distinct stages) and contract integration (production or marketing agreements between nominally independent firms located at adjacent stages of the subsector).

There are at least five major functional stages of the fed beef subsector: cow-calf operations, grower-stocker operations, feedlots, meatpackers and fabricators, and meat distributors. (The branch of the beef subsector utilizing spent dairy cattle is quite different and will be ignored here). Data quoted here are primarily from the early 1980s (Marion, et al. 1986).

Cow-calf producers are small (average 150 head) and widely dispersed on ranches around the country. Calves are presently raised to 500 to 600 lb. and sold seasonally at 6 to 9 months of age. Almost 90% of the calves are placed in growing operations or directly to feedlots.

Growing-stocking operators raise calves on roughage until they reach 700 to 800 lb. This is the least distinct stage of the beef subsector because 40-50% of feeder cattle come from integrated cow-calf operations. Thus, approximately 50-60% of feeder cattle were purchased in auction markets by growers. Moreover, about 20-30% of all feeder cattle come from growing operations that are vertically integrated with feedlots, the rest being sold through order

buyers or auction markets.. Thus, only about 15-25% of all feeder cattle reaching feedlots have been sold twice in markets, once as calves and second as steers or heifers.

Feedlots raise feeder cattle to 1,050 to 1,250 lb. using enriched grain feeds. Unlike growers, feedlot sales and geographic location are more concentrated. Feedlots with daily capacity of 1,000 or more marketed 68% of all fed cattle in 1982, up from 35% in 1962. The largest (8,000 head or more) 300-400 feedlots are commercial feedlots (as opposed to farm feedlots) and account for over 50% of U.S. fed cattle. Approximately 20-30% of fed cattle are from feedlot-owned growing operations, and 5-9% from feedlot-owned cow-calf operations. About 4% of fed cattle move from feedlots owned by packers in the early 1980s, down from 7% in mid-1960s. Some of the largest feedlots are owned by major feed grain companies (Cargill, Continental).

Cattle feeding is also geographically concentrated. The top 8 states were Nebraska (18%), Texas (17%), Kansas (13%), Iowa (12%), Colorado (8%), California (5%), Illinois (4%), and Oklahoma (3%). Shift to Plains states encouraged by new milo varieties, irrigated grain supplies, and packer locations. In 1982 beef shipments for 8 states were Nebraska (21%), Texas (16%), Kansas (14%), Iowa (10%), Colorado (6%), California (3%), Illinois (3%), and Oklahoma (1%).

Feedlots sell 90% of their cattle direct to packers, 5% through auction markets, 2% in terminal cash markets, and 4% internal transactions (vertical integration). Markets are used for smaller and mixed lots of cattle. In 1965 the proportions were 42% direct, 31% terminal, 19% auction, and 8% internal. In the mid 1980s about one-third of fed cattle were sold on a "hot weight" basis (which requires substantial trust between feedlots and packers), up from 11% in 1965. Contractual integration between feedlots and packers, which is a special type of "direct" sale, has accounted for 10% to 25% of sales of fed cattle since 1960. According to USDA estimates, 10% of fed cattle were sold

under packer contracts in 1960, 18% in 1970, and 10% in 1980. Recently signed contracts may have raised contractual and vertical integration into the 20-25% range (Rose 1989). Contractual integration by beef packers is far below the levels found in broilers and turkeys (89% and 62% in 1980).

Beefpackers and processors purchase practically all fed cattle. Prices are determined administratively for the 4% of the cattle that come from packer-owned feedlots. Cattle sold under contract use various formulas based on grade, yield, cash prices, future prices, and adjustments.

The majority of fed cattle are priced by private negotiations on each lot between feedlot operators and field-level packer representatives. Field-level buyers may be salaried employees of packers, agents, or brokers. In the late 1970s, salaried buyers accounted for about 90% of cattle purchases. Field-level buyers are in frequent daily contact with the beefpackers' head buyer. the head buyer manages five to ten salaried buyers per plant and is responsible for developing a daily pricing strategy and specific buy orders. The head buyer arrives at a daily offer price after assessing many pieces of information from sources within and without the firm. From carcass salesmen the buyer learns about future delivery obligations to retailers, planned retail specials, and wholesaler inventories; salaried field buyers provide information on feedlot conditions and prices paid by competing packers; other divisions tell buyers slaughtering costs, delivery costs, product shrinkage, planned plant operating levels, and by-product prices; from external sources head buyers get information on average carcass prices (by grade and type), cash prices for cattle traded, prices for other meat products, cattle futures prices, and weather conditions. The details of how such information is used to arrive at a daily price policy is well described by Ward (1988:58-79).

Although backward vertical integration to feedlots is substantial, there is no important forward vertical or contractual integration by packers. Carcass beef is sold primarily in direct trading between packers and

distributors; over two-thirds of these trades are priced from formula agreements, the remainder by private negotiations or offer-acceptance arrangements. In contrast, boxed beef direct trading is mostly by negotiated pricing, particularly when retailers are the buyers. Boxed beef or fabricated beef products are sold to foodservice customers mainly under cost-plus formula-pricing arrangements.

Retailers purchase 75-80% of all the beef from packers, of which about half is sold directly to integrated grocery wholesaler-retailers and half to specialized meat wholesalers. Another 15% to 20% is sold to commercial and institutional foodservice operators. An important and growing segment of the foodservice channel are fast-food chains; these operations are major customers for lean ground beef made from tougher carcasses and trimmings. There is evidence that wholesale-retail beef margins are larger in high-concentration cities (Hall, et al. 1979).

Considering the highly seasonal nature of cow-calf operations (at least 70% of calves are born in the first six months of the year), the seasonal availability of pasturage, and seasonal beef demand patterns, overall subsector coordination is generally rated pretty high by economists. Considerable smoothing of supplies takes place at the grower and, especially, feedlot stages. Distributors do their part by adjusting the mix of cuts seasonally (more roasts in winter, more steaks in summer) and using relative prices to clear the market of a perishable product. Even consumer freezer inventories of beef help subsector coordination a bit.

Summary

The proper delineation of a market requires an examination of the demand for a product (consumer behavior), supply of a product (production side), and geographic scope. Studies of U.S. household purchasing behavior confirm that beef in fresh or frozen form is a distinct product. Furthermore,

consideration of the technology of meatpacking production and distribution leads to the conclusion that boxed beef has become a separate industry from carcass beef. In terms of geographic scope, beef cattle markets are quite localized. In the principal area of the U.S. for fattening cattle (west of the Mississippi plus the Eastern Corn Belt), fed cattle are bought by beefpackers in approximately 15 distinct markets. However, boxed beef and carcass beef are sold into what is essentially a national market (except for about 3% of the value of U.S. beefpacker shipments sold in international markets). Neither imports nor foreign direct investment have broken down the U.S. border as a boundary for domestic sales of beef.

C. Market Concentration

Recall that market concentration measures the number and size inequality among buyers or sellers in the same market. While numbers of sellers are readily available for most stages of the beef subsector, numbers of buyers are not. The smaller the number of buyers or sellers, the more concentrated a market.

There are several indexes of size inequality used in market structure analyses. Data on sales by or purchases of individual firms yields market shares; the larger the shares of leading firms, the more concentrated the market. Finally, a statistic that provides a useful industry wide indicator of seller concentration is the four-firm concentration ratio (CR4), which is simply the sum of the market shares of the four leading firms in a market. Concentration ratios can also be obtained for the top 8, 20, and 50 firms in most mining and manufacturing industries, but the CR4 is by far the most widely employed statistic in empirical investigations of market power.

The various concentration measures we will examine are useful as indicators of market structure categories. As numbers of firms approach one and market shares or CR4 approach 100%, the market is evolving into a structural

monopoly. However, concentration is not proof of monopolistic behavior or performance. That is, high concentration only a necessary condition of monopolistic pricing; it is not a sufficient condition of monopolistic pricing. It is possible that a monopolist might act in the interest of consumers or suppliers and price at competitive levels. It must recognized that such a "good monopoly" would be sacrificing returns to its owners by doing so.

Between the extremes of atomism and monopoly lie structural oligopolies -- industries with "small" numbers of sellers and "high" concentration. Oligopoly theory is much more complicated than either perfect competition or monopoly. Yet, most oligopoly models predict that the higher the degree of concentration, the closer the price to the monopoly price. Considerable statistical evidence and market experiments support the general finding that with up to three or four sellers or with CR4 above 40% to 60%, supranormal profits or supranormal prices are generated.

Beef Producer Concentration

From a twentieth century zenith of nearly seven million in the mid 1930s, the number of U.S. farms and ranches has fallen to barely over two million in 1987. Because there are so many farms, concentration is very low. Aggregate farm sales concentration, as measured by the share of sales by the top 5%, has risen about 20% since the end of World War II. By 1982, more than 30% of farm product sales came from farms with at least $500,000 in sales, about triple the share of farms in 1949 with the same constant-dollar sales (Marion, et al. 1986:Chapter 1).

In 1987, there were about 840,000 ranches raising beef cattle of which 380,000 had at least $10,000 in sales (data from 1987 Census of Agriculture). The latest information on concentration among cattle producers is that the 16,000 largest (500 head or more) ranches (1.6% of the total held 30% of cattle inventories. In 1982, there were 970,000 ranches primarily devoted to

raising red-meat animals (cattle, hogs, and sheep), which was 40.5% of the total number of U.S. farms. The largest size class of such farms (at least $500,000 in product sales) accounted for 29% of sales of red-meat animals. A concentration index* for beef cow farms rose about 25% from 1974 to 1982; for fed beef, the index crept upward only about 2% (Marion, et al., 1986:13).

Concentration among the three producer stages (cow-calf, grow-out, and feedlots) is highest for fed cattle. The number of U.S. feedlots has fallen drastically, from 121,000 in 1970 to 43,000 in 1988. In 1982, larger feedlots (1,000 head or more one-time capacity) accounted for 68% of national fed cattle marketings, which was double the share in 1962. By 1987, the share of the larger feedlots had risen to 84% in the 13 major cattle states. The 381 largest (8,000 head or more) U.S. feedlots accounted for 50% of fed cattle marketings in 1982. By 1987, the 201 largest feedlots (16,000 head capacity) sold over half of the fed cattle in the 13 major cattle states.

Note that these national concentration data understate true concentration because of the regional nature of meat animal markets. Nevertheless, even when properly carved up into perhaps 25 to 50 regional markets for live cattle, it is highly doubtful that any one market would have less than 1,000 feeder cattle producers or more than 10% of sales accounted for by the top four producers. And in areas with the largest feedlots, fed cattle CR4 is very likely under 40%. These are atomistic markets by any standard.

Meatpacker Concentration

More data is available over a longer period for meatpacker sales concentration than on any of the other stages of the beef subsector. The industry has been the subject of intense public scrutiny periodically since the 1880s

---

* The Gini coefficient.

when the "Beef Trust" was formed. The Sherman Antitrust Act was passed in 1890 partly as a result of concerns expressed by farm groups that meatpacker concentration was excessive. Yeager (1982) reports that the Big Four dressed beef concerns handled 85% of market sales in the 1880s.

One of the first targets of the Federal Trade Commission (established in 1914) was an investigation of the five largest meatpacking companies, launched in 1918. In 1920 the Big Five signed a consent decree with the FTC agreeing to forego further consolidation and to sell their stockyards, railroad equipment, refrigerated warehouses, and meat stores. The Packers and Stockyards Administration was formed in 1921 to regulate the meatpacking industry. Nicholls (1941:333) reports that the CR4 of federally inspected cattle slaughtering plants was 71% in 1920; it remained in the 68% to 73% range until 1934, after which it slowly declined. (Four-firm concentration of all slaughter, including wholesalers and on-farm was around 45% in 1934). In 1965-1966, the U.S. National Commission on Food Marketing (1966) devoted one of its ten technical studies to the meat industries. The remaining discussion focuses on trends in concentration since 1945.

Number of Slaughtering Plants

The number of meatpacking plants (beef, pork, veal, lamb, and mutton) recorded by the Census Bureau ranged from 2,154 to 2,992 during 1947-1977 (Connor 1982), dropping to 1,780 in 1982. In addition, there were about 1,300 to 1,400 meat processing plants, many of which slaughter. The year 1963 was the peak for meatpacking plants; after 1963 the net number fell by 2.8% per year.

The number of federally inspected slaughtering plants has declined since at least 1972 (P&SA-USDA data). Plants slaughtering steers and heifers fell from 807 in 1972 to 435 in 1985, a decline of 46% in 13 years. Pork slaughtering plants also fell over the same period by 33%. Almost all of the

decline in steer/heifer slaughtering plants was absorbed by plants with animal slaughter of less than 250,000 head. The number of plants slaughtering 500,000 or more steers and heifers increased from 3 in 1972 to 17 in 1985; moreover, these largest beefpacking plants now account for 53% of total steer/heifer slaughter, up from 7% in 1972.

Meatpacking Companies

The number of U.S. meatpacking companies rose from 1,999 in 1947 to a peak of 2,833 in 1963 and declined to 1,658 in 1982 or by 2.9% per year (Connor 1982, 1988). In food processing generally the number of companies has been declining at a rate of about 4% per year. Most meatpacking companies are single-plant firms, some of them operating on a seasonal or custom-slaughter basis.

By 1987, after a spate of very large mergers, three companies have come to dominate the meatpacking industry (Marion 1988). They are: IBP (formerly Iowa Beef Processors, now a subsidiary of Occidental Petroleum); Cargill (acquired MBPXL, now called Excel, which in turn had acquired Spencer Beef and Sterling Beef, both among the top 10 beefpackers), and ConAgra (acquired E.A. Miller, Monfort of Colorado (4th largest beefpacker), and Swift Independent (2nd largest porkpacker and 3rd largest beefpacker). The Big Three today control about 60% of sales in the beefpacking market.

Seller Market Concentration

In 1920, the four leading meatpackers shared 46% of the U.S. market for red meats (Yeager 1981:243). Cattle and hog slaughter by the Big Five meatpackers reach their maximums around 1918 at 55% and 45%, respectively (Nicholls 1941). This was the height of control by the Beef Trust. Except for a slight rise in sheep slaughter the mid 1930s, national concentration declined in meatpacking thereafter. From 41% in 1947, four-firm sales

concentration in meatpacking reached its nadir in 1977 at 19% (Table 1). Concentration in beef, veal, and pork packing all reached historical lows in the 1967-1977 period.

Bureau of the Census data show that national CR4 in beefpacking reached a low point of 25% in 1977 and then rose to 44% in 1982 (the latest year available). I estimate that beefpacking CR4 rose to 74% in 1987 (Table 1). However, because several large beef fabricating plants are classified as wholesaling operations, the Census of Manufacturers data increasingly understate the true level of sales concentration in meatpacking. Nevertheless, a 72% increase in CR4 in ten years (1972-1982) is very large by historical standards. That CR4 in beefpacking probably tripled between 1977 and 1987 is simply outside the realm of experience.

P&SA data on concentration of animals slaughtered is a useful substitute measure. These data include fabricating as well as slaughtering plants, but they may understate concentration if the leading packers purchase higher-yield animals or sell meat at a higher unit price than smaller firms. National four-firm concentration (CR4) for steer/heifer slaughter was 28-29% from 1972 to 1977 (Table 2). <u>From 1977 to 1987 it rose from 29% to 67%, an increase of 131%</u>. Such an increase in CR4 is completely unprecedented in this century. The next highest decennial increase in CR4 that can be found in the food processing industries is beer (SIC 2082), which rose from 51% in 1972 to 79% in 1982, a 54% increase (however, if one goes back to 1954, beer concentration rose by 204% in 28 years). Concentration of culled cow-bull slaughter has varied from 9% to 20% since 1969.

Porkpacking is much less concentrated, with CR4 rising from 33% in 1967 (an historical low point) to 39% in 1982 according to Census data. P&SA data show nearly constant hog slaughter CR4 of 32% to 35% in the 1970s. However, mergers in 1987 increased the CR4 to 37%. The top three companies (IBP,

Table 1. Concentration Ratios for U.S. Meatpacking, 1947-1987.

Year	Industry or Product Class (SIC Number)											
	Meat-packing (2011)		Meat Processing (2013)		Beef (20111)		Veal (20112)		Lamb (20113)		Pork (20114)	
	CR4	CR8	CR4	CR8	CR4	CR8	CR4	CR8	CR4	CR8	CR4	CR8
	Percent[1]											
1947	41	54	--	--	--	--	--	--	--	--	--	--
1954	39	51	--	--	36	43	49	56	61	74	42	56
1958	34	46	--	--	31	38	41	50	60	69	39	53
1963	31	42	16	23	26	34	36	44	54	67	36	50
1967	26	38	15	22	26	35	37	50	57	73	33	48
1972	22	37	19	26	30	42	27	46	55	76	37	50
1977	19	37	23	30	25	36	32	56	58	82	37	55
1982	29	43	19	28	44	55	55	74	59	86	39	59
1987[2]	54	68	--	--	74	92	85	99	76	99	40	60

-- = Not available.

[1]The percent of industry value of shipments (or product class values of product shipments) accounted for by the plants of the four leading firms (CR4) or eight leading firms (CR8).

[2]Estimated from comparable data in Table 2 and historical ratios.

SOURCE: U.S. Bureau of the Census. 1982 Census of Manufacturers: Concentration Ratios in Manufacturing (MC82-S-7).

Table 2. Concentration of U.S. Commercial Livestock Slaughter, 1909-1988.

Year	Species or Type							Proportion of Beef Boxed
	Cattle	Steers & Heifers	Cows & Bulls	Boxed Beef	Calves	Sheep	Hogs	
	Percent[1]							
1909	36	--	--	--	--	44	34	0
1910	38	--	--	--	--	46	32	0
1911	38	--	--	--	--	49	35	0
1912	38	--	--	--	--	49	34	0
1913	41	--	--	--	--	54	35	0
1914	40	--	--	--	--	55	36	0
1915	44	--	--	--	--	56	38	0
1916	47	--	--	--	--	57	39	0
1917	53	--	--	--	--	60	41	0
1918	55	--	--	--	--	59	45	0
1920	49	--	--	--	34	62	42	0
1930	48	--	--	--	46	68	38	0
1940	43	--	--	--	46	66	44	0
1950	36	--	--	--	35	64	41	0
1951	32	--	--	--	35	63	41	0
1952	34	--	--	--	36	64	39	0
1953	34	--	--	--	39	63	38	0
1954	32	--	--	--	38	62	39	0
1955	31	--	--	--	37	61	41	0
1956	30	--	--	--	37	62	40	0
1957	29	--	--	--	35	58	39	0
1958	27	--	--	--	32	57	36	0
1959	25	--	--	--	30	54	34	0
1960	24	--	--	--	29	53	35	0
1961	24	--	--	--	30	55	34	0
1962	24	--	--	--	29	55	34	--
1963	23	--	--	--	29	55	34	--
1964	23	--	--	--	32	57	35	--
1965	23	--	--	--	32	58	35	--
1966	22	--	--	--	30	59	32	--
1967	22	--	--	--	30	58	30	--
1968	22	--	--	--	29	54	30	--
1969	23	30	20	--	27	60	34	--
1970	21	27	16	--	24	53	32	--
1971	21	28	13	--	27	53	32	--
1972	25	29	12	--	22	57	32	31
1973	24	29	11	--	24	56	33	--
1974	24	29	14	--	24	56	34	--

Table 2 (Continued).

Year	Species or Type							Proportion of Beef Boxed
	Cattle	Steers & Heifers	Cows & Bulls	Boxed Beef	Calves	Sheep	Hogs	
1975	22	28	13	--	25	57	33	--
1976	22	29	12	--	25	53	35	--
1977	22	29	11	54	25	55	34	--
1978	24	30	10	59	28	56	34	--
1979	29	37	10	51	30	64	34	48
1980	28	39	10	53	31	56	34	51
1981	31	43	10	57	29	52	33	55
1982	32	45	9	59	28	44	36	59
1983	36	47	10	61	28	44	29	66
1984	37	50	11	62	29	42	35	70
1985	39	50	17	62	31	51	32	74
1986	42	54	18	68	26	51	33	76
1987	54	67	20	80	30	75	37	80
1988	--	--	--	82E	--	--	--	83E

[1]From 1909 to 1918, the percent held by the Big Five packers (Armour, Cudahy, Morris, Swift and Wilson), where commercial slaughter includes federally inspected and other wholesale-retail establishments. From 1920, the four largest firms in each species or type (however, in 1923 Armour acquired Morris, so from 1923 to 1959 the top four cattle-slaughtering firms equal the former Big Five).

-- = Not available
E = Estimated

SOURCE: U.S. House of Representatives (1980:197-306); Nicholls (1941); Packers and Stockyards Administration-USDA, Statistical Resume (various years); Marion (1988); Helmuth (1984); Hogeland (1988).

ConAgra, Excel) now hold 30% to 40% of the fresh pork market. Concentration in sheep slaughter reached an historic high in 1987 (Table 2).

As was argued above, the appearance of boxed beef in the 1960s created a new industry segment within beefpacking. Prior to 1960 virtually all of the sales of beefpackers were in carcass form, that is, partially trimmed sides or quarters of refrigerated beef. Carcass sales required grocery retailers to have central meatcutting plants or extensive, expert in-store butchering. Boxed beef eliminates a great deal of the retailer preparation of beef, and the heavy plastic packaging facilitates the removal of oxygen thereby extending shelf life by several days. Boxed beef sales accounted for 31% of all beef sales in 1972 and is now more than 80%. The degree of concentration is markedly higher in boxed beefpacking than in steer/heifer slaughtering. The boxed beefpacking CR4 rose from 54% in 1977 to more than 80% today. IBP, ConAgra, and Cargill/Excel today account for about 75% to 80% of the boxed beef market.

It is important to note that the market shares of the Big Three meatpackers are fairly close today. During the period of rapid growth of boxed beef sales in the 1970s, IBP held a distinct market-share lead, but the ranks and shares of all the other leading firms changed rapidly. Rapid growth, market share instability, and the entry of new sellers are all factors that discourage cooperation in selling prices of beef. Most industry observers are convinced that the Big Three are intensive rivals on the selling side of their operations; each has been willing to use price cutting to maintain or increase its market share. The failure of IBP to gain a dominant market position in boxed beefpacking (say, a market share of 40% or higher), has so far kept price leadership patterns from developing (such as was seen historically in the steel and cigarette industries).

However, the appearance of significant excess capacity in fabricated beef facilities in the 1980s implies that the threat of entry by new competitors is

much diminished. Several beef fabricating plants are operating on single shifts presently; conversion to double shifts could be effected quickly and would significantly lower costs of production. Without some distinct technological advantage, a would-be entrant will judge entry to be more risky than when plant capacities are more fully utilized. Moreover, much slower growth in boxed beef is anticipated in the future, both because of consumer demand conditions and because the shift from carcass to boxed beef is nearly complete. Finally, while in the 1970s wholesaler-buyer concentration was as high or higher than beefpacker concentration (see Section B.3 below), by the late 1980s the situation was reversed. For all these reasons, market conditions today lend themselves to greater cooperation in selling prices than has been possible since the early 1920s. Significantly, should further mergers take place involving the Big Three, especially a merger of two of them, conditions would be ripe for price leadership to develop in beef selling.

When does CR4 reach a level that is "too high," that is, a critical level above which monopoly pricing is feasible or likely? This is a much debated question in economics, and the answer depends on a number of factors besides mere seller concentration levels. For example, blockaded entry, homogeneous commodities, equal access of the leading firms to the same technology of production, relatively low buyer concentration, and slow or declining industry growth are all factors that facilitate pricing collusion or cartel-like behavior. Given these conditions, numerous studies of the food manufacturing and other manufacturing industries strongly suggest that the critical level of four-firm concentration lies between 40% and 60%. By the time CR4 reaches 80%, pricing can usually be maintained at monopoly levels. It appears that beefpacking has recently passed beyond the critical threshold level of seller concentration. Moreover, the other market conditions necessary for monopolistic pricing to develop are largely satisfied in the beefpacking industry of the late 1980s. (These are necessary, not sufficient conditions, for the

potential members of a cartel may still refuse to join despite the profit potential for doing so).

Buyer Concentration of Meatpackers

Beef marketing is essentially national in scope for the leading firms, but meatpacker procurement is far more localized. Most hogs and cattle are purchased within 100 miles of the slaughter plant to avoid dehydration and shrinkage and to ensure "just-in-time" delivery. Ward (1988) found that 80% of cattle were slaughtered within 150 miles of packing plants in the Plains States and 135 miles of Midwestern packing plants. Marion (1988) and Quail, et al. (1986) identified 13 cattle procurement regions for the 25 U.S. states west of the Mississippi but including the Eastern Corn Belt. For example, the Denver region includes Colorado and the western half of Nebraska. In these 13 regions, average four-firm buyer concentration (BCR4) was just under 50% in 1971, rose slowly to 57% in 1978, and jumped to 82% in 1986; the beefpacking mergers of 1987 have likely raised averaged BCR4 to 90%.

Ward (1988) found some cattle procurement studies that identified significantly smaller buying regions. For example, he identified southwest Kansas, the Oklahoma panhandle, the Texas North Plains, and the Texas South Plains as four separate buying regions. However, Quail, et al., considered this to be one beef procurement market centered on Amarillo. While most authors consider state boundaries too small on average, P&SA data on BCR4 in each state are published regularly. In 1985, the 10 leading steer/heifer states had BCR4s ranging from a low of 72.3% (Nebraska) to 99.9% (Colorado).

Meat Wholesaler Concentration

The question to be addressed here is the degree of buyer concentration faced by beefpackers when they sell carcass beef or boxed beef to distributors. If meat wholesaler concentration is high, then the potential power over

selling prices for beef cannot be easily exercised by beefpackers. That is, the bargaining power of meat wholesalers may act as a countervailing force when the leading beefpackers attempt to raise selling prices above competitive levels. This is the same argument often used in justifying the concerted activities of farmer bargaining cooperatives where processor concentration is high.

Beef sold to consumers in grocery stores is distributed through two wholesale channels. The largest portion is purchased by employees or agents of the major U.S. grocery chains or grocery stores affiliated with cooperative or voluntary wholesaler organizations. These retailer buyers may negotiate purchases for all the regions in which the chain operates, but a more typical pattern is for purchasing to be delegated to a divisional meat buyer. Retailer "divisions" correspond to a major metropolitan area and the surrounding region served by the retailer's warehouse. Typical divisions are Northern California (centered in San Francisco), Chicago (including portions of Wisconsin, Illinois, and Indiana), and Washington-Baltimore. A minor portion of beef is sold through independent grocery stores or chains too small to own their own wholesale distribution facilities. In this case, retailers purchase their beef from specialty meat wholesalers which operate in regions that correspond closely to the retail-chain divisions just described. Thus, beef sold in grocery stores is mainly sold at wholesale in approximately 40 to 60 geographic regions of the United States.

How concentrated are wholesale buyers in these regions? Nationally, grocery store sales are not highly concentrated. The top 20 grocery store chains account for 35% to 40% of sales today, which is about double the share they held in 1948 (Marion, et al. 1986:332, excluding A & P). However, when measured at the more appropriate metropolitan-area level, four-firm concentration (CR4) in the 54 largest city markets averages about 61% (projected from Marion, et al. 1986:307 and Cotterill 1989). In 1958 the CR4 in the 54

largest U.S. metropolitan areas was only 48%. Thus, within major U.S. cities, grocery sales concentration increased almost 30% in the last 30 years.

Somewhat less information is available about specialty meat wholesaler concentration. About the only reliable source is a USDA study of grocery wholesaler concentration conducted in the early 1970s for 14 appropriate geographic regions of the United States. General-line wholesalers' CR4 averaged 73% in the 14 markets, but this type of wholesaler handles little refrigerated beef. The CR4 for specialty meat wholesalers averaged about 33%; numerous mergers in grocery wholesaling since then may have raised CR4 to around 40% today.

In summary, beefpacker salespersons face moderate to high levels of wholesale-meat-buyer concentration when attempting to sell carcass or boxed beef. On average, the top four grocery chains purchase 55% to 60% of the beef sold directly to integrated retailer-wholesalers. Of the beef sold through the separate distribution channel serving nonintegrated grocery stores, the four largest buyers command about 40% of sales. These levels of buyer concentration are high enough to provide significant, if not overwhelming, countervailing power against the tendency of leading packers to raise beef prices. However, if beefpacker seller concentration were to rise much farther above present levels, the countervailing power of wholesalers will count for little.

D. Product Differentiation

Fresh beef is among the most homogeneous processed food products. It is true that producers have been spending substantial funds ($30 million in 1987) for generic advertising and promotion of beef to U.S. consumers, but that amount pales by comparison with the $35 billion spent by food and tobacco manufacturers on brand advertising in 1987 (IRS data). Some growers have attempted true product differentiation by branding their beef (in cooperation

with a packer) and touting some special quality characteristics such as "organic" or "natural." These efforts are on a small scale so far, and it is rather early to tell how large consumer demand is for these specialty products, which typically sell at 25 to 50% retail price premiums.

In the U.S. food system generally, manufacturers are responsible for most product differentiation. Through a combination of packaging, mass-media advertising, and promotions aimed at consumers or distributors, consumer-product food manufacturers attempt to maintain or expand their market shares by building brand loyalty. However, meatpackers are largely prevented from stimulating packer brand loyalty because final wrapping and merchandising is in the hands of food retailers. Retailers use their meat and produce departments to create a quality image for their stores. Meat items are often featured in retailer newspaper advertisements to create a low-price image as well. Most retailers promote beef through shelf display methods, on-call store butchers, fat content labeling, heavy trimming, preparation of highly convenient prepared meat items (skewered shish-ka-bob, ready-to-bake meatloaves, marinated grilling meats, etc.), and through featuring high-grade (USDA prime or choice) meat cuts.

The majority of consumers report that USDA quality grades are an important guide to beef purchases (Petritz, et al. 1982). Many consumers spend time inspecting beef cuts for fat color and marbling, which are visible features that correspond somewhat with USDA quality grades. Grade-consciousness is known to increase with household incomes and consumer education levels. In retail outlets where USDA grades are not featured, consumers rely on the store's reputation or assurances of beef quality as a guide to purchasing; in these cases, quality assurance is akin to the private label ("store brand") programs in the packaged foods area. In either case, it is the government's or retailer's reputation that conveys a "summary signal" of quality to most consumers. In the packaged goods area where inspection of the contents by

consumers is often impossible, it is the manufacturer's trademark that conveys that summary signal to consumers. In sum, as long as present fresh meat retail merchandising methods continue there is little scope for meatpacker brand differentiation of fresh beef at the consumer level.

That is not to say that building brand loyalty for beef is impossible. Some distributors may already be wedded to the boxed beef products of particular meatpackers; that is, some wholesalers or retailers may be willing to pay a few pennies per pound more for the boxed beef of certain packers because they perceive a level or consistency of quality absent in other packers' products or delivery methods. Moreover, many other meat products that were formerly undifferentiated now command considerable consumer brand loyalty. Bacon, formerly sliced on custom basis by retailers, has been packaged and moderately promoted to consumers for several decades. Most turkeys are frozen, packaged, and branded by the processor; the Swift brand commands a distinct retail price premium and yet has a strong consumer following. Packaged trays of chicken parts now carry the Perdue, Holly Farms, and other recognized trademarks. Particularly interesting is the price premium obtained for whole Perdue chickens in the Northeast through a combination of humorous TV advertising and a feed mix that develops a deep orange fat that is recognizable by consumers.

The main lesson from these analogous meat products is that packer packaging of consumer cuts or some physical difference readily observed by consumers at retail are necessary conditions for creating brand loyalty. Packaging frozen beef at the plant is one alternative that will probably meet with considerable consumer resistance because of the purple tone that develops with freezing. Prepackaged consumer cuts of fresh beef that are able to claim a significant attribute of value to consumers will likely be the easiest route to packer branding. Some smaller packers marketing so-called "light" or "organic" beef appear to be leading the way, but it is difficult to tell if a

mass-market can be developed on such differences. Another feasible alternative is to establish packer-owned retail outlets, either separate specialty stores or in-store "boutiques" clearly identified with the packers trademark. This is actually a return to the method employed by Swift and other packers before the 1920 Consent Decree forced divestiture of packer-owned store; now that the decree has been nullified, such a strategy is legal.

Successful packer differentiation will also require distributor cooperation in apply different margins for prepackaged beef than they do for boxed beef packaged at the store. In general, percentage retail mark-ups are higher for highly differentiated foods than for less processed items; in other words, manufacturer margins and distributor margins are positively correlated (Connor and Weimer, 1987). The current retailer practice of applying uniform mark-ups to all fresh meats inhibits the introduction of packer branded beef.

E. Economies of Scale and Other Barriers to Entry

Entry barriers are necessary for market power to be maintained in the long run. Without barriers, entry will increase the numbers of sellers to the point that cooperative pricing or output decisions becomes infeasible.

Entry barriers are of many sorts. Effective product differentiation may itself act as a barrier to new entry. Once well established, habitual purchases by consumers of their favored brand become expensive to dislodge. That is, the unit cost of switching consumer loyalties to would-be entrants is typically higher than the cost of reinforcing repetitive purchases to incumbent firms. Developing a new brand involves large sunk costs, which creates an exit barrier. Moreover, retailers are often loath to carry more than a few brands in any product category. In the fresh poultry area, one observes only one or two brands being carried in a given store alongside the stores' own offerings of unbranded poultry. When local grocery concentration is high (the

CR4 in metropolitan areas now averages about 60%), the opportunities for multiple brands to coexist are limited.

A second source of barriers to entry is cost conditions. A minimum optimal scale that is very large relative to the size of the product market or a procurement market for an essential input is a barrier to entry given that would-be entrants must often start up at suboptimal product levels.

Economies of scale do not appear to inhibit entry into most producer levels. Cow-calf operations are quite small, with average herd sizes of only about 150 head. Grower-stocker operations are a bit larger, but still tiny relative to total market output. In some areas, access to pasture or water rights may slow entry or expansion. The size of some feedlots may indicate substantial economies of scale are present. The largest 300 to 400 feedlots control about 50% of national marketings of fed cattle, but it is unusual for even the largest feedlot in a given procurement market to control more than 5% of the supply. However, constraints on the water supply or effluent treatment may prevent or slow entry of rival feedlots in some areas.

The principal stage of the beef subsector where economies of scale are most prevalent is in beefpacking (Marion 1988, Ward 1988). A specialized steer/heifer packing plant with a capacity of 250,000 head per year exhausts most economies of scale (reaches minimum optimal scale). Economies of scale are greater in boxed beef fabricating plants -- probably between 500,000 and 1,000,000 head per year. Thus, an integrated slaughtering-fabricating plant would utilize 2% to 4% of the U.S. fed cattle supply. Optimal size meatpacking plants built in the 1950s accounted for only 0.1% to 0.9% of national supply (Connor, et al. 1985:154).

From the point of view of procurement, a single, optimally sized, integrated slaughtering-fabricating plant represents 20% of the cattle supply or more in 10 of 13 major cattle regions (Marion 1988). Thus, four such plants could soak up 80% of the total supply of steers and heifers. Since the late

1970s, excess capacity has been widespread in the beefpacking industry. Leading beefpackers have large, modern plants ready to come into production at short notice. This may well have discouraged entry by new firms. There is a substantial body of theory that shows that excess capacity maintained for strategic (entry-forestalling) purposes can be as effective or more effective in preventing entry than limit-pricing strategies.

Absolute capital barriers into beefpacking are formidable. A new integrated slaughter-fabricating plant of 500,000 capacity costs $20 to $40 million (Marion 1988). Of course, by comparison with many other industries (automobiles, beer, corn fructose) where optimal plants today cost around $500 million, absolute capital size in beefpacking is modest. Generally, large absolute investment sizes are not significant barriers unless the major established packers can borrow capital at preferred rates compared to smaller firms or potential entrants. IBP and Excel, which are parts of much larger entities, may well have superior borrowing positions because of their percent companies' cash flow or financial reputations.

Future technological changes appear to call for ever larger economies of scale in beefpacking. Several developments in animal genetics point to the development of cattle with more uniform weights, configurations, and anatomical structure. Ultrasonic and magnetic systems will aid feedlots and packers to reduce heterogeneity within lots of cattle. Indeed, genetic cloning of cattle, which has already begun on a small scale, holds out the promise of virtually identical meat animals. Absolute uniformity of material inputs is the food engineer's dream. Faster production lines with greater use of automated slaughtering equipment would then become possible. Superior sensing and control instruments, computerization, and even robotization could be implemented if cattle were more uniform.

On the other hand, labor, sanitation, and inspection considerations may place limitations on the adoption of speedier slaughtering methods. The large

fine levied on IBP by the Federal Occupational Safety and Health Administration (OSHA) spotlighted severe and apparently rising worker safety problems. The proposed Streamlined Inspection System proposed by the USDA for certain large beefpacking plants might have increased labor productivity by as much as 40% (Ingersol 1989). However, concerns about a possible reduction in food safety levels recently led USDA to withdraw the proposal. Doubtless, new techniques will also be developed to attenuate the repetitiveness and dangerous work conditions facing beef industry workers and to speed safety inspection of beef.

Changing Concentration

The extraordinary jump in beefpacker concentration deserves some attention. In some ways, the increase does not fit historical patterns of changing concentration in the food manufacturing industries. Previous empirical investigations found that increasing concentration was positively related to the intensity of consumer advertising effort and negatively related to the initial level of concentration (Connor, et al. 1985:108-113). Certainly the first factor is not relevant to beefpacking, and the initially low CR4 would account for only 5 percentage points of the increase observed.

Economies of scale have often been identified as sources of increased concentration. The theory is that scale economies that increase faster than industry sales force smaller firms (mainly owners of smaller single plants) to exit because their higher unit costs cause them to become noncompetitive in pricing. There is little empirical evidence that supports this theory in the case of the food manufacturing or general manufacturing literature.

Neither plant nor multiplant economies of scale justify the high observed levels of concentration in beefpacking today. If each of the top four meatpackers owned one optimal-size boxed-beef plant, CR4 would be at most 16%; assuming that three plants (the upper estimate from studies of three other

food processing industries) would exhaust all multiplant economies, CR4 would be in the 24% to 48% range. Thus, plant and multiplant economies of scale can account for at most half of the increase in beefpacker concentration observed since the mid 1970s. Moreover, the wage advantages once enjoyed by IBP have spread through union give-backs to most of the other boxed beef packers.

Mergers have played a decisive role in increasing concentration in beefpacking. IBP, founded in 1961, made its first acquisition in the same year (Rose 1989). More slaughtering plants were acquired in 1963 (Iowa Pork), 1966 (Sioux Quality), 1967 (two plants), 1969 (Blue Ribbon, which was successfully challenged by the U.S. Department of Justice), 1976 (Madison Foods, Columbia Foods), 1982 (two plants), 1985 (two plants), 1988 (Heinhold), and 1989 (one plant). Of the 10 high-volume beef plants currently operated by IBP, four were acquisitions. ConAgra was incorporated as Nebraska Consolidated Mills Company in 1919 and acquired numerous grain and flour mills throughout its history. It has taken control of dozens of poultry and fish processing plants since 1971. Entry into the beef industry was initiated by its 1983 acquisition of Armour Food Company for $182 million; Armour was one of the Big Five packers in 1900. More beef assets were purchased in 1985 (Northern States Beef) and 1987 (E.A. Miller, Monfort, Swift Independent). ConAgra is by far the most diversified firm in the beefpacking industry (11 slaughter plants), with major market positions in beef, pork, lamb, poultry, processed meats, fish, and beef feedlots. The Excel division of Cargill traces its origins to Excel Packaging (founded 1936), Missouri Beef Packers (1966), and Kansas Beef Industries (incorporated from six predecessors in 1969). In 1964, Missouri Beef and Kansas Beef merged to form MBPXL. Cargill outbid ConAgra for MBPXL in 1979 and has since made beef acquisitions in 1983 (Spencer), 1986 (Del-Pero), and 1987 (Sterling). Cargill also has investments in pork, meat processing, eggs, and feedlots. In summary, around 60% to 70% of the beefpacking capacity of the Big Three today was bought rather than built. There is no

evidence that food industry mergers have been accompanied by post-merger efficiency increases (Connor and Geithman 1988).

An area that is little researched is the economies of multiplant ownership in beefpacking and economies of scope (from multispecies operations). There are several arguments from economic principles that would lead one to expect such economies to exist (Nelson 1985); moreover, there is spotty evidence of multiplant advantages in other food processing industries (Connor et al. 1985). If so, single-plant, single-line beefpackers will suffer cost disadvantages that will eventually cause them to exit the industry, unless they find smaller niches outside the main grocery store channel that they can profitably serve.

F. Market Structure and Market Power

Producer Level

The market structures of the cow-calf and grower-stocker levels of the beef subsector do not permit them to acquire market power in the long run. Concentration is very low; cattle of the same yield and grade are essentially homogeneous; and scale economies or other barriers appear to be absent. Feeder cattle operators have all the symptoms of classical price-takers. There is no hint in rates of return data or economic analyses of persistent competitive problems at these stages.

Based on market structure features, feedlots may well be evolving into positions to become price-makers, particularly on the buying side of their operations, but on the whole they appear to have not yet arrived there. Concentration levels are low enough in most feeder cattle markets to prevent collusive pricing arrangements to persist for long. Economies of scale are large in absolute terms, but still modest relative to market size; farm feedlots in many areas are cost competitive with the larger commercial feedlots. It is true that feedlot operators, because of their frequent contact with packer

buyers, may well have occasional information advantages when buying feeder cattle relative to cattle sellers, particularly nontransaction information. On the other hand, sellers appear to be well supplied with up-to-date cash and futures price transactions information on live cattle. This is not to say that more producer information on daily beef (particularly boxed beef) prices would not improve price discovery at this stage. Continuing buyer-seller loyalty doubtless plays a role in pricing offers of feedlots, but this may well be innocuous if it represents a reduction in search costs for information on herd quality.

Meatpacker Procurement

Market structure conditions lend themselves to monopsony pricing by meatpackers, at least sporadically and in some procurement markets, if not all. Moreover, there is a surprising consensus among the empirical studies that have examined the relationship of fed cattle prices to levels of concentration.

Most fed cattle are purchased by beefpackers or their agents within 100 miles of the beefpacking plant to which the cattle are shipped. Bids and offers are typically made at feedlots after personal inspection of the cattle in a pen. (Less than 10% of all fed cattle are now purchased at auction markets or terminal cash markets, though in some areas of the U.S. the percentage is higher). The process is one of direct negotiation, and the delivery terms and price are determined by bargaining ("private treaty"). Most large beefpacking plants have five to ten buyers. A 1979 sample survey found that in the Plains States, about 40% of the feedlots had four or few packer buyers bidding on cattle during the month of July; in Midwestern feedlots about 80% had four or fewer bidders. On a daily or weekly basis, the number of bidders would be fewer, and since 1979 many plants have closed.

With sufficient numbers of bidders and balanced information, in general direct trading methods result in moderately accurate price efficiency and equitable prices. However, when buyers are as few as two or three and when buyers have significantly more information than sellers, prices are likely to be below competitive levels. There is an income transfer from producers to packers (Marion, et al. 1986:99).

A study by Ward (1988) explained variation in 334 observations of July 1979 fed cattle prices (on a live-weight basis) collected from 31 feedlots or marketing agents. The key result of interest is that each additional buyer raised the price of fed cattle by 22 to 28 cents per hundredweight, all other things held equal (among the "other things" were daily wholesale carcass price, August futures contract price for live cattle, the degree of forward purchasing, USDA grade, yield, dressing percentage, lot size, and region). In Ward's sample, the number of buyers ranged from 5 to 11 in each of six cattle buying regions (a region was specified as ranging from 3 to 23 counties). The six regions included parts of Kansas, Oklahoma, and Texas. Comparing the most concentrated with the least concentrated procurement markets, Ward's results indicate that 1979 fed cattle prices were depressed by $1.30 to $1.70 per cwt. by buyer concentration. Based on average 1979 Omaha choice steers price of $67.67 per hundredweight, cattle prices were reduced by at most 1.9 to 2.5% His model explained up to 96% of the variation in prices.

Menkhaus, et al. (1981) also studied the impact of beefpacker concentration on fed cattle prices. Annual data on the average price of choice grade slaughter steers were collected in 12 states for the year 1972 and 15 states for the year 1977. Also developed was the CR4 for beefpackers in each state. Their model explained 79% of the variation in prices across states. In both years, CR4 was found to be significantly negatively related to fed cattle prices (controlling for state slaughter surplus or deficit, meatcutters' wages, choice grade steer carcass prices, and average feedlot size). Thus,

the more concentrated (fewer buyers) procurement, the lower the prices paid for fed cattle in the state. Menkhaus, et al. found that for each 10 percentage point increase in the CR4 of meatpackers, the price of choice fed steers (900-1100 pounds) fell by $0.145 per cwt. in 1972 and by $0.22 per cwt. in 1977. The range on CR4 across the states was about 30 percentage points, so based on average Omaha choice steer prices, fed cattle prices were depressed by at most 1.2% in 1972 and by 1.6% in 1977. These estimates are slightly lower than Ward's. States may be too small to accurately reflect the boundaries of cattle procurement markets (Williamson, et al. 1982).

Finally, Quail, et al. (1986) examined annual average fed cattle prices in 13 regional markets covering 25 states for the years 1971 to 1980. They also found that regional beefpacker concentration had a significant negative influence on prices paid to cattlemen. If one compares buyer concentration in one region with another region with a CR4 that is 10% higher, fed cattle prices were $0.14 per cwt. lower in the more concentrated region. The mean level of CR4 for 1976-1980 varied from 30% to 95%. Thus, comparing prices for the range in CR4, cattle prices for 1976-80 were reduced by 1.7% because of buyer concentration. The authors also note that the rise in CR4 in their sample regions from 1971 and 1980 caused cattle prices to fall $0.19 per cwt., or by about 0.3%, a loss of $45 to $50 million for feedlot operators. Quail, et al. were able to control for several other factors likely to affect cattle prices, viz., the proportion of large feedlots and plants, beef shipping costs, meatpacker wage rates, fed cattle surplus or deficit, and the change in market shares among meatpackers.

Each of the three statistical studies of the relationships of buyer concentration to fed cattle prices report the same basic finding. When comparing two different market situations--one with large numbers of cattle buyers (low buyer concentration) and one with small numbers of buyers (high concentration)--high concentration is associated with significantly lower live cattle

prices. Is it fair to attribute lower cattle prices to the noncompetitive behavior (market power) of cattle buyers when they have few rivals bidding for a given supply of cattle? Are there limitations on these statistical studies that call for qualifications of the market power finding?

There are two possible limitations. First, each of the studies is "cross-sectional"; that is, each study used data from a slice of time that ranged from one month (Ward) to five years (Quail, et al.). Moreover, each study drew on data from 1972 to 1980, and one may question whether the results can be applied to the situation facing the U.S. beef subsector in the late 1980s, especially given the great increase in packer concentration in the last ten years. It is a common caution in interpreting statistical results of these kinds to be careful in extending the results beyond the range of the data. The reply to this concern is that all of the studies included some cattle buying regions that were already as concentrated in the 1970s as the most concentrated regions of the late 1980s. In that sense, we are safe in applying results from 1970s data to the present day. If concentration had declined since the 1970s, then severe doubts would exist in applying the findings to the late 1980s. It is only by repeating such analyses with data from the late 1980s that we can be absolutely sure that the cattle buyers' market power is actually being exercised, but the burden of proof now lies with those who deny the existence of such a relationship.

Second, a more subtle criticism of the three statistical studies is what is called "specification error". In brief, this criticism means that if some factor associated with the measure of buyer concentration is omitted from the models, then the effect of concentration on cattle prices may be overestimated or underestimated ("biased"). For example, if the beefpacking plants in high-concentration areas are systematically more efficient, then concentration's effect on cattle prices is biased. However, in this case we may point to the model of Quail, et al., which included additional variables that capture the

size (a proxy for efficiency) of meatpacking plants and feedlots in the cattle procurement region. Therefore, the negative effect of concentration on cattle found by Quail, et al. cannot be due to the greater efficiency of large-scale slaughter plants (though such bias may be found in the other two studies). Another example of specification error might be the failure to control for the costs of feedlot-to-plant cattle assembly. If packer concentration is systematically higher (or has increased faster) in regions where plants are more efficiently located to reduce average assembly costs, then the concentration-price relationship may be biased. The studies reviewed did not directly measure assembly costs, so it is a question to be addressed by future research whether concentration and assembly costs are correlated and, if correlated, whether the concentration-price relationship is weakened.

To summarize, buyer concentration has had significant depressing effect on fed cattle prices. Considering their diverse time periods, data sources, and methods of analysis, the three studies surveyed are remarkably consistent in their findings. In all three studies, fed cattle prices were from 1.2% to 2.5% lower each year in the most concentrated cattle procurement regions compared to the most competitive regions. However, under the average concentration conditions prevailing in the 1970s, cattle prices were about 0.5 to 1.0% lower than they would have been under perfectly competitive conditions. Because the price of fed cattle accounted for 57% of the retail price of choice beef, the impact on consumer beef prices from the exercise of buying power by beefpackers in the 1970s was at most 0.6% to 1.4%; the likely average impact was to raise retail beef prices by 0.3% to 0.6%. It may also be noted that nine other statistical studies reviewed by Ward (1988:166-170) found that buyer concentration was inversely related to the prices of hogs and slaughter lambs. Three of these found that there was a significant decline in hog prices in the area surrounding a recently closed porkpacking plant; the price effects lasted for several weeks at least.

Selling Prices of Meatpackers

Assuming that meatpackers want to maximize profits, there are several ways of doing it. Lowering prices paid for major inputs such as slaughter animals is one tactic. Raising selling prices is another. Both pricing strategies would cause packer margins to widen. (Stimulating sales or productivity changes while holding output prices steady are other strategies for increasing total profits). By "raising" selling price we mean relative to what the price would be under perfect competition, not necessarily raising price over time.

There are no published studies that focus exclusively on the relationship of beef or meat prices to meatpacker concentration. However, there are a number of studies that have included meatpackers or the meatpacking industry among a broader sample of food processing companies and industries. Such studies were reviewed in Connor, et al. (1985:Chapter 7). From the estimated relationships it is possible to predict whether supranormal product pricing is expected given the structured configuration of the industry at hand. In the cases of beefpacking and meatpacking, virtually no monopolistic overcharge was found from a sample of 1976 processed food prices. (Meat processing, on the other hand, had an expected price elevation due to market power of from 1.0 to 1.3%).

Unfortunately, these predictions are based on the structure of the meatpacking industry as it was in the mid 1970s, a period when concentration was near its lowest level in history and entry was easy. It is difficult to believe that the higher levels of concentration and barriers to entry seen today (levels considerably higher than the buyer concentration of meat distributors) would not cause some price elevation. Similarly, should fresh beef become as differentiated as bacon and sausage are today, one might expect price elevations to consumers that are similar to the meat processing industry in the 1970s (U.S. House of Representatives 1980).

Meatpacker Margins

The margins generated by meatpackers are the differences between the selling prices of meat and the buying prices (costs) of inputs purchased from other enterprises. Purchased inputs include cattle, containers, energy, business services, and machinery and equipment. The margins consist of three principal components: returns to labor (wages, salaries, and fringe benefits), returns to capital (dividends and retained earnings), and business income taxes. If input and product markets are highly competitive, then employees earn wages consistent with their skill levels (return to human capital) and investors earn a long-run return on investment consistent with business risk in the industry (a risk-adjusted normal rate of return). If, on the other hand, market power is being exercised in either the input markets (e.g., labor unions or cattle markets) or product markets, then wages or profits may be at supracompetitive levels.

It is paradoxical that beefpacker margins have fallen during the same period that their market power on the buying side (and probably the selling side as well) has increased. The explanation for this apparent inconsistency is that some components of beefpacker margins shrank while one or more other components did not.

As is shown in Table 3, the farm-to-carcass price spread for beef has fallen in real terms (fifth column) and relative terms (sixth column) throughout the 1966-1988 period. Expressed in 1967 dollars, the spread fell from 5.2 cents (1966-1970 average) to 3.3 cents (1984-1988 average). Part of the drop is due to packer-to-retailer transportation costs, but most of the spread is accounted for by beefpacker costs of production. For example, wage rates of meatpacking workers remained nearly flat from 1965 to 1979, varying from $3.25 to $3.50 per hour (1967 dollars); however, changes in labor contracts, including substantial labor union "give-backs", led to marked declines in real wages after 1979, to as low as $2.25 per hour (1967 dollars) in the late 1980s.

Table 3. Prices and Spreads for Beef, Choice Yield Grade 3, 1966-1989.

Year	Retail Price[1]	Net Farm Value[2]	Marketing Spreads for Beef: Farm-to-Carcass[3]	Marketing Spreads for Beef: Carcass-to-Retail[3]	Deflated Farm-to-Carcass Price Spread[4]	Farm-to-Carcass Price Spread as a Proportion of the Retail Price
	Cents per pound					Percent
1966	84.4	54.3	5.3	24.8	5.66	6.3
1967	84.6	55.2	5.4	24.0	5.40	6.4
1968	88.7	58.8	5.5	24.4	5.12	6.2
1969	98.6	64.5	5.5	28.6	4.74	5.6
1970	101.7	63.9	5.9	31.9	5.07	5.8
1971	108.1	70.5	6.9	30.7	5.96	6.4
1972	118.7	75.6	6.4	36.7	5.28	5.4
1973	142.1	94.2	6.5	41.4	4.04	4.6
1974	146.3	91.4	8.6	46.3	4.76	5.9
1975	154.8	99.0	9.2	46.6	5.08	5.9
1976	148.2	84.1	7.4	56.7	3.82	5.0
1977	148.4	85.5	8.3	54.6	4.13	5.6
1978	181.9	111.1	8.2	62.6	3.78	4.5
1979	226.3	140.8	9.7	75.8	4.16	4.3
1980	237.6	145.0	10.4	82.2	4.38	4.4
1981	238.7	138.5	10.8	89.4	4.09	4.5
1982	242.5	140.5	10.2	91.8	4.04	4.2
1983	238.1	136.2	9.2	92.7	3.56	3.9
1984	239.6	140.0	7.6	92.0	3.35	3.2
1985	232.6	126.8	8.4	97.4	3.42	3.6
1986	230.7	124.4	8.7	97.6	3.64	3.8
1987	242.5	137.9	7.4	97.2	3.14	3.1
1988	254.7	147.4	6.5	100.8	2.83	2.6
1989I	266.3	159.1	3.6	103.6	1.74E	1.4

[1] The estimated weighted-average of Bureau of Labor Statistics prices of retail cuts of beef from a Choice Yield Grade 3 carcass. Data for 1989 are first quarter only.

[2] The feedlot price including delivery to the slaughterhouse or packing plant. Average of eight market prices, four terminal markets, and four direct-sales arrangements, collected weekly, in the late 1980s. Price is net of by-products allowances (retail trim and packer by-products).

[3] Price is delivered in carcass form to a Los Angeles retailer.

[4] Deflator is the producer price index (PPI) 1967=100 for "crude consumer (finished) foods" as reported in the Economic Report of the President (Table B-63 in the 1989 report).

Source: USDA (May 1989, August 1978).

Combined with impressive labor productivity gains of about 3% per year, real labor costs per unit of output fell dramatically in meatpacking (Ward 1988:139-43). A large source of the productivity increases in beefpacking may be ascribed to the introduction of boxed beef and associated large-scale assembly-line technologies, though labor productivity was increasing fast in the 1950s and 1960s before boxed beef was a significant factor. It is likely that the smaller meatpacker spreads yielded higher cattle prices for producers and lower beef prices for consumers than would have been the case had these changes not occurred.

Note that the packer price spreads shown in Table 3 are the sum of packer margins and costs of production. Profit margins (pre-tax) of beefpackers are generally less than 2% of sales, which means that profits account for, at most, one-third of the farm-to-carcass spread, and perhaps as little as 3% in some years. Thus, even a doubling of profit rates would increase the spread only slightly. The effects of labor costs, economies of scale, and productivity changes on the spread very likely overwhelm the opposing changes in the spread engendered by rising profits.

Meatpacker Returns

After-tax returns for meatpackers average about 1% on sales, but for comparison with other industries those returns should be related to stockholders' equity (invested capital). From 1974 to 1985, meatpackers had returns averaging 11.0% (according to the American Meat Institute) or 14.4% (Forbes magazine compilation). Beefpackers' profits rates have been historically 40% to 50% higher than hogpackers, so by projection 1974-85 beefpacker profits as reported to AMI averaged about 16.1%. Beefpackers' profits are about the same as other food processors in that period, but are significantly higher than the rest of manufacturing (Connor 1988). In the 1960s and early 1970s, meatpacker

profits were significantly lower than other food manufacturers (U.S. National Commission on Food Marketing 1966).

There are very few studies of the relationship of meatpacker profits or margins to market structure. Those that have been published suffer from severe data limitations. Ward (1988:187-190) correlated published after-tax profit rates (from AMI and Forbes magazine surveys) with Census Bureau CR4 data. Using published 1974-1985 profitability data means overlooking some privately owned or nonresponsive firms; data on only 12 firms were collected. Moreover, as previously mentioned, Census data are increasingly poor in their coverage of some beef fabricating plants. Finally, no control variables were included in Ward's model. A second model estimated by Ward used Census price-cost margin, which are based on fairly complete meatpacking plant data; however, in this case the other criticisms (poor concentration data, no controls) remain. It is quite likely that these shortcomings are responsible for the failure to find any correlation between profits and meatpacker concentration.

A study by Schroeter (1988) uses a considerably more sophisticated method of analysis (see Schmalensee 1988, Christina-Tsigas 1989). In this case, wholesale margins in the beef subsector were examined over time to see whether there was evidence of change in the exercise of market power. The index of market power for the beef industry was found to rise above competitive levels, especially in the late 1970s, though the index was still below pure monopoly levels even at the end of the period examined.

Thus, the evidence of market power on the selling side of the beefpackers operations is mixed at best. Solid evidence from the 1970s points to a contribution of 0.2 to 0.4 percentage points to sales margins from the buying power of beefpackers. That is, in the late 1970s the after-tax profits of beefpackers would have been one-quarter to one-third lower if beefpackers had been fully price competitive. Changes in market structure since then suggest

that the monopoly rents of beefpackers may be a higher proportion of accounting profits today.

G. Competition Policy

There are many ways for societies to assert social control over domestic markets that are experiencing "market failure." Laissez-faire policies are predicated on the belief that markets are reasonably competitive. If concentration is low and market entry is easy in a homogeneous product market, competition among sellers produces socially optimal results -- maximum production at the lowest possible price. Since 1980, federal antitrust and regulatory enforcement has been minimal (Connor, et al. 1985). Indeed, a significant degree of deregulation has occurred during the last decade, with a marked slowing in the late 1980s. The present presidential administration has given few hints as to its future regulatory or antitrust initiatives. In this section we explore the likely implications for the beef industry of alternative policy scenarios.

Continued Laissez-Faire

In this scenario, we assume that of the antitrust laws on the books, only overt price conspiracies (cartels) are strictly enforced. Laws covering price discrimination (including predatory pricing), mergers, monopolizing markets, consumer protection, and other restraints on trade are in abeyance.

There is little doubt that concentration would rise further, though not as fast as in the last ten years, fueled primarily by mergers. If the kinds of mergers in the beef industry in 1987 (or the chicken business in 1989) are permitted to continue, nothing can stop a merger of the second- and third-ranking firms; once they become number 1, the former leader will be free to buy the fourth-ranked company; and so on. Only a relatively small number of beefpackers will be left to serve relatively specialized "niche" markets too

small to interest the major packers (kosher, military, some foodservice, and the like). The leading beefpacker(s) will be able to achieve rates of return on equity as high as the highest in the beverage or tobacco industries -- around 25%, double present levels. To accomplish this, packer margins would need to double, with beef prices rising 1% or cattle prices falling by more than 1% or some combination of the two. These price changes would reduce slightly the competitiveness of beef vis-a-vis other meats and in international markets.

Cooperative Organization

With a laissez-faire regulatory climate, cattle growers or feedlot operators could take advantage of the Capper-Volstead law that permits farmers cooperatives to act as bargaining agents (i.e., collude legally on selling price) for cattle producers in negotiations with meatpackers. The law allows cooperatives to nullify the market power of packers in procurement of cattle. It is even possible for cattle cooperatives to enter beefpacking. Packer market power could still be wielded on the selling side, but only consumers would pay, not producers. While this scenario represents a feasible option, the independent character of most cattle producers makes them much less likely to organize than dairy farmers.

Rigorous Enforcement of Antitrust Laws

More assiduous enforcement of existing antitrust provisions or clarification of enforcement procedures by the Congress would have its greatest impact on halting proposed future mergers. For example, the authorities might halt horizontal mergers involving packers with at least a 5% market share. Similar standards could be applied to the buying side as well as the selling side of beefpackers' operations. The present structure would be frozen, as historically the courts have been reluctant to dissolve already merged firms.

In addition to stricter merger enforcement, Congressional direction is needed in at least three other areas: private antitrust suits, conglomerate firm strategies, and price discrimination. In the well known Illinois Brick case, the Supreme Court decided that parties indirectly injured by price-fixing conspiracies had no standing in the federal courts. Yet, a 1989 decision by the Court has let stand state laws that would permit, for example, cattlemen to sue retailers who fixed meat prices. It appears that the Court is ready to accept as constitutional Congressional efforts to give standing to indirectly injured parties in antitrust suits. Second, clarification is needed concerning conglomerate firms' conduct. There are virtually no restraints on conglomerate mergers under present laws. The practice of many conglomerates of using profits from one line of business (for example, petroleum or processed meats) to subsidize long-term losses in another line (for example, below cost pricing to gain market share in beefpacking) probably is legal, despite the negative effect it can have on industry structures. Finally, Congressional direction is needed to develop standards for the application of the Robinson-Patman Act which prohibits anticompetitive price discrimination. The Act has fallen into virtual disuse at the federal level for several years.

The impacts of renewed antitrust attention, particularly at the federal level, are fairly straightforward. Smaller surviving packers would be less concerned about the effects of discriminatory pricing and other unfair tactics. Major packers could grow only by building new plants, cost-cutting, expanding exports, or making acquisitions abroad. Prices and profits would remain at 1980s averages.

Increased Market Regulation

The "deregulation" movement of the 1980s appears to have run out of steam. There may be greater political will to impose constraints on business

behavior in areas like food safety and quality, ingredient and nutrition labeling, consumer protection, expanded use of mandatory business information disclosure, and reduced legal protection of trademarks and trade names (see Connor, et al. 1985:379-391).

The effect of most of these initiatives would be to make accurate information more widely available for consumers, stockholders, and competing sellers. Data on profitability of SEC-regulated packers and other firms in the beef subsector, by line of business (beef, veal, pork, etc.) would provide guides to investment, including signals to new firms to enter high-profit lines of business;. Foreign-owned and privately owned firms above a certain size could be required to file abbreviated public reports on their financial performance. Renewed consideration of grades, standards, and labeling would reduce the scope for product differentiation and attendant nonprice competition. Misleading use of vague terms ("organic," "natural," and "light") cause confusion among consumers; there is an implied disparagement of products not carrying such identifiers. Trade regulation rules could be developed to ensure that the terms convey meaningful quality information to buyers.

As major beefpackers and distributors become more conglomerated, suppliers to and customers of such firms suffer information loss. Product differentiation shifts the focus of seller rivalry from price competition to nonprice strategies. These conditions are not yet severe in the beef subsector, but regulatory initiatives along the lines suggested above would prevent the erection of additional barriers to entry and social waste in the form of excessive brand-oriented selling effort. These departures from competitive market structures have been the source of considerable price elevation in the other food industries.

References

Charlier, Marj. Raisers of "Natural" Cattle Fear Losing Market Niche. Wall Street Journal (May 17, 1989):B1-B7.

Christina-Tsigas, Helen. What Have We Learned From the New Empirical Industrial Organization? Manuscript, Department of Agricultural Economics, Purdue University, West Lafayette, IN (May 1989), 21 pages.

Connor, John M. Structural Adjustment of the Food Industries of the United States, ERS Staff Report No. AGES820723. Washington, DC: ERS-USDA (July 1982).

Connor, John M. Food Processing: An Industrial Powerhouse in Transition. Lexington, MA.: Lexington Books (1988).

Connor, John M., et al. The U.S. Food Manufacturing Industries: Structure, Strategies, Performance, and Policies. Lexington, MA.: Lexington Books (1985).

Connor, John M. and Frederick E. Geithman. Mergers in the Food Industry: Trends, Motives, and Policies. Agribusiness 4(Spring 1988):331-346.

Cotterill, Ronald W. Mergers and Concentration in Food Retailing, Research Report No. 2. Storrs, CT: Food Marketing Policy Center, University of Connecticut (January 1989).

Crom, Richard J. Economics of the U.S. Meat Industry, Agric. Info. Bulletin No. 545. Washington, DC: ERS/USDA (November 1988).

Hall, Lana, Andrew Schmitz, and James Cothern. Beef Wholesale-Retail Marketing Margins and Concentration. Economica 46(1979):265-300.

Handy, Charles and James M. MacDonald. Multinational Strutures and Strategies of U.S. Food Firms. American Journal of Agricultural Economics 71(December 1989).

Hogeland, Julie A. Market Access in an Era of Structural Change in the Livestock Industry. Washington, DC: ACS/USDA (September 26, 1988).

Huang, Kuo S. U.S. Demand for Food: A Complete System of Price and Income Effects, Tech. Bull. No. 1714. Washington, DC: USDA (1985).

Ingersol, Bruce. New Beef Inspection Would Be So Cursory Even Packers Are Wary. Wall Street Journal (May 16, 1989):A1-A6.

Logan, Samuel H., Lisa J. Steinmann, and Donald E. Farris. Economics of Meat Processing in the United States, in Economics of Food Processing in the United States, Chester O. McCorkle (ed.). San Diego: Academic Press, Inc. (1988).

Marion, Bruce W. and NC 117 Committee. The Organization and Performance of the U.S. Food System. Lexington, MA: Lexington Books (1986).

Marion, Bruce W. "Restructuring of Meatpacking Industries: Implications for Farmers and Consumers." Testimony, House Agriculture Committee, Iowa State Legislature, December 7, 1988.

Nicholls, William H. Imperfect Competition Within Agricultural Industries. Ames, IA: Iowa State College Press (1941).

Petritz, David C., Steven P. Erickson, and Jack H. Armstrong. The Cattle and Beef Industry in the United States: Buying, Selling, Pricing, CES Paper 93. West Lafayette, IN: Cooperative Extension Service, Purdue University (1982).

Quail, Gwen, et al. The Impact of Packer Buyer Concentration on Live Cattle Prices, Working Paper 89. Madison, WI: NC Project 117 (1986).

Raikes, Ronald. Feeder Cattle Marketing Channels and Exchange Arrangements, in Coordination and Exchange in Agricultural Subsectors, Monograph No. 2. Madison, WI: NC Project 117 (January 1976).

Rhodes, V. James. Exchange Arrangements: Fed Beef Cattle, in Bruce W. Marion (ed.). Coordination and Exchange in Agricultural Subsectors, Monograph No. 2. Madison, WI: NC Project 117 (January 1976).

Rose, John W. ConAgra, Inc., Excel Corporation Division of Cargill, Inc., and IBP, Inc.: Firm Histories. Manuscript, Department of Agricultural Economics, Purdue University, West Lafayette, IN (June 1989), 21 pp.

Schroeter, John R. Estimating the Degree of Market Power in the Beef Packing Industry. Review of Economics and Statistics 70(1988):158-162.

Schmalensee, Richard. Industrial Economics: An Overview. Economic Journal 98(1988):643-681.

USDA. Packers and Stockyards Statistical Resume: Reporting Year 1987. Washington, DC: U.S. Department of Agriculture (1989 and previous years).

USDA. Livestock and Meat, Situation and Outlook, (August 1978 and previous issues).

USDA. Livestock and Poultry, Situation and Outlook, (May 1989 and previous issues).

USDA. U.S. Trade and Prospects: Dairy, Livestock, and Poultry, FDLP 2-1989. Washington, DC: FAS/USDA (March 1989).

U.S. Department of Commerce, Bureau of Economic Analysis. U.S. Direct Investment Abroad. Washington, DC: BEA/DOC (June 1988).

_____. Foreign Direct Investment in the United States. Washington, DC: BEA/DOC (June 1988).

U.S. House of Representatives, Subcommittee on SBA and SBIC Authority, Committee on Small Business. Small Business Problems in the Marketing of Meat and Other Commodities: Part 7-Monopoly Effects on Producers and Consumers. Washington, DC: U.S. Government Printing Office (1980).

U.S. National Commission on Food Marketing. Organization and Competition in the Livestock and Meat Industry, Technical Study No. 1. Washington, DC: U.S. Government Printing Office (June 1966).

U.S. Senate Subcommittee on Antitrust and Monopoly, Committee on the Judiciary. Unfair Trade Practices in the Meat Industry, Hearings held May 10, 1957. Washington, DC: U.S. Government Printing Office (1957).

Ward, Clement E. Meatpacking Competition and Pricing. Blacksburg, VA: Research Institute on Livestock Pricing (July 1988).

Yeager, Mary. Competition and Regulation: The Development of Oligopoly in the Meat Packing Industry. Greenwich, CT: JAI Press (1981).

NE-165

PRIVATE STRATEGIES, PUBLIC POLICIES & FOOD SYSTEM PERFORMANCE

Working Paper Series

Purpose: The NE-165 Working Paper Series provides access to and facilitates research on food and agricultural marketing questions. It is intended to be a publication vehicle for interim and completed research efforts of high quality. A working paper can take many forms. It may be a paper that was delivered at a conference or symposium but not published. It may be a research report that ultimately appears in full or abbreviated form as a journal article or chapter in a book. Using the working paper series enables a researcher to distribute the report more quickly and in more extensive detail to key research users. A working paper may also be an end product in itself, for example, papers that collate data, report descriptive results, explore new research methodologies, or stimulate thought on research questions.

Procedures: Working papers may address any issues in the food and agricultural marketing area as described in the NE-165: Private Strategies, Public Policy and Food System Performance, project statement. This research agenda is available from Professor Ronald Cotterill, Executive Director of NE-165 at the address given below. A prospective working paper should be forwarded to the Executive Director who will coordinate a review of the paper by two research peers. Alternatively authors may submit two independent peer reviews with their paper. Based upon independent reviewer comments the Executive Director may accept, accept with revisions, or reject the submission. If accepted the Executive Director will issue working paper covers, and a mailing list to the author who shall have responsibility for preparing and distributing copies to all persons and organizations on the mailing list. Additional copies of working papers are available from the author or from the office of the Executive Director at The University of Connecticut.

Professor Ronald W. Cotterill, Executive Director NE-165
Department of Agricultural Economics and Rural Sociology
Box U-21
The University of Connecticut
Storrs, Connecticut 06268