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**ECONOMIC IMPLICATIONS OF MARKET DEVELOPMENTS
IN THE BEEF INDUSTRY**

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ABSTRACT

Major beef processors have announced plans to build more slaughtering facilities even though the industry already has some eight percent excess capacity. One major packer engages in forward pricing arrangements with cattle feeders, while another threatens to feed their own cattle if the practice continues. The National Cattlemen's Association is studying the effect of these types of developments on price discovery and market structure. The Beef Industry Council continues its generic advertising program for beef after celebrity-related embarrassments and without conclusive assessment of program effects.

These and other current developments in the beef industry have implications for cattle producers, industry middlemen and beef consumers. This paper explores these in an industrial organization framework. Market structure, conduct and performance criteria is used to show the likely impacts on procurement practices, costs, productivity, prices and profits. Recently published studies and statistics are the basis for assessing the implications of industry changes on the several segments of the beef industry.

The relevance of this analysis to the Pacific Northwest lies on the relative importance of beef industry to the region including ranching, cattle feeding and slaughtering/processing activities. From the consumer standpoint beef products are a major item in the household food budget. While the export market for beef rates headlines, industry developments within the U.S. market have more potential impact for American beef producers and consumers: some 98 percent of U.S. beef production is consumed domestically.

RECENT MARKET DEVELOPMENTS IN THE BEEF INDUSTRY

As the 1980 decade draws to a close, the U.S. beef industry continues to undergo rapid changes in market operations. While export market potential, especially to Japan, rates headlines, developments within the U.S. market have more potential impact for American beef producers and consumers. Americans consume some 98 percent of U.S. beef production.

Some of the new developments include the announcement by Iowa Beef Processors (IBP) of plans to construct a new slaughtering plant with 1.1 million head annual capacity in Lexington, Nebraska. IBP is currently the nation's largest beef slaughterer (8+ million head per year). At the same time Monfort of Colorado, the second largest packer and a subsidiary of ConAgra, one of the country's largest food processing corporations, has announced plans to increase its annual slaughtering capacity by one million head. These two developments will increase total beef slaughtering capacity by about four percent, even as the industry already has nearly eight percent excess capacity relative to current volume. This paper explores what these and other developments may mean for cattlemen, other packers and housewives.

Another area of activity concerns pricing and marketing arrangements. Excel Corporation, the number three beef packer owned by Cargill, the grain merchandising giant, enters into forward pricing arrangements for up to one-half of the cattle it kills. (Forward pricing entails setting price ahead of delivery date. It can be practiced in cash markets as well as through futures trading where offsetting transactions can be used to cancel out previous market positions.) Forward price contracting has upset IBP officials to the extent they have stated an intention to feed their own cattle if feeders continue that pricing arrangement.

Meanwhile one of the largest cattle feeding companies in the country, Cactus Feeders, Inc., of Texas and Colorado (300,000+ head capacity in six feedlots), and the feed processing firm Moormans Manufacturing Co. of California, Inc., have initiated a joint arrangement to provide a link between retained ownership customers (cattlemen who have animals custom fed) and an IBP-Cactus carcass quality value-based marketing program. The partnership is named Fifth Season Feeders and will be promoted and marketed to cattlemen by the Moormans sales force.

Next enters the cattle industry as represented by the National Cattlemen's Association (NCA). Disturbed by the controversy over forward contracting and concerned about increasing market concentration (proportion of the market controlled by the few largest firms), the NCA set up a task force on consolidation and integration. An outside study has been commissioned to look into concentration in the beef packing industry and what it might portend for the future of price determination and the organization of the cattle industry.

At the same time the Beef Industry Council of the National Live Stock and Meat Board continues its beef advertising campaign. The focus has shifted from high profile to lesser known personalities. Controversy continues to surround both the choice of promoters and the thrust of the program. There is talk of replacing "celebrities" with "commoners." But the impact of industry-wide advertising on beef demand is unknown; results of several studies are inconclusive.

DEVELOPMENT, PROGRESS, CHANGE: WINNERS AND LOSERS

Change is inherent in a dynamic society. In a market-oriented economy where prices indicate the outcome of buying and selling transactions, producers, middlemen and consumers continuously adjust their activities to react best to the current situation. This describes the process of economic development and progress. Resource discovery, new technology, inventions, changes in prices among alternative resources, products and resource-product combinations: all of these are the elements of development, progress and change.

Not all parties are affected in the same direction or in equal amount by change. New ways create opportunities but they also threaten or erode existing positions.

The U.S. beef processing industry has undergone many changes over the past 150 years: from home slaughter and preserving, to local slaughter plants, to large-scale packing plants adjacent to terminal stockyards served by railroads for shipping both live cattle and carcasses in refrigerator cars, to decentralized slaughter and breaking plants located in cattle feeding areas and using truck transportation. Product form has evolved from hanging carcass to boxed primal or subprimal cuts, to boned-out (boneless) beef, to portion controlled and retail shelf-ready products. Extended shelf-life fresh beef (up to several weeks) is in the development and adoption stage.

Who are the winners and who are the losers when the beef industry develops and progresses through change? The stakes are large: food expenditures, after housing and transportation, comprise the largest component of the American household budget. Beef products have historically been a major item in the household food budget.

ANALYZING INDUSTRY DEVELOPMENT: MARKET STRUCTURE AND PERFORMANCE ANALYSIS

One of the approaches economists use to gain insights on the impacts of industry change and development is industrial organization or market structure analysis. It includes three major elements: structure, conduct and performance.

Structure defines and measures the physical dimensions of an industry. That is, it documents the number of firms and plants and their size, both absolute size and size in relation to the total industry (the latter is termed concentration level or ratio). Market structure also identifies products and product differences (differentiation) of industry firms, and it describes entry and exit conditions: the ease or difficulty of firms to get into or out of the industry.

Conduct, the second element of market structure analysis, is concerned with the behavior of firms in the industry or what types of decisions firm managers can make. The possible decision-making areas include

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setting prices, determining quantity of production, sales promotion and advertising policies, coordinating price, output and promotion activities, and determining tactics directed against competing firms. Conduct options are related to market structure. For instance, a rancher cannot set the market price for his cattle; nor has he any reason to attempt to put his neighbor out of business. He operates in a market structure described as pure competition. On the other hand, a packing plant manager may or may not be able to set the price at which he buys live cattle or sells beef products. Pricing options will depend on the number and size of other packers, that is, the market structure of the packing industry. The packing plant operator may well be motivated to adopt tactics detrimental to existing rival packers and to potential new firms.

Performance, the third element, entails assessing the impacts of an industry's market structure and conduct in relation to the expectations or goals of society. These impacts are measured in terms of product prices, costs of production, volume of output, and advertising and promotion costs. These are economic efficiency standards or guidelines. Another part of market performance is progressiveness: the contribution of an industry to new, better and safer products. Economic stability is a third area of performance. It involves an industry's impact on such macroeconomic factors as employment and price levels, inflation rate and international trade balances.

Some recently published studies and statistics address the subject of market structure, conduct and performance in the beef industry, particularly the packing-processing segment. The reports are useful in revealing what has happened in recent years. Several are listed in the references at the end of this paper. Based on these and other information sources, some observations can be made about the potential impacts of current developments in the beef industry.

MARKET STRUCTURE DEVELOPMENTS IN BEEF PROCESSING AND FOOD RETAILING

Beef Processing Market Structure

Several generations of change in ownership in meat packing firms have taken place in the 1970 and 1980 decades. The "Big Four" companies (Armour, Swift, Wilson, Morrell) which dominated the industry for nearly a century, have all undergone change in ownership. Initially they became subsidiaries of conglomerate corporations, retaining their name identity. In later acquisitions and reorganizations even that link to the past has disappeared. The meat packing industry in the late 1980s is dominated by the "Big Three": IBP, ConAgra and Excel. Together these three firms account for some 75 to 80 percent of boxed beef production, the prevailing wholesale market product form.

Economies of size is the term used to indicate the relationship between volume of output and the average or per unit cost of producing a given output. Economic theory explains the logic of decreasing average cost as firm size and output increase: the fixed or overhead costs are spread over more units of output, thus reducing the overall cost of producing each unit. However, this outcome comes about only if other costs of production, the operating or variable costs, do not rise faster than the fixed costs decline, both measured in average or per unit terms. Thus economies of size are not automatically assured when firms grow larger.

Economies of size are an important factor in determining the structure of an industry. If increasing size results in lower costs of production, the larger firm enjoys a competitive advantage. Size economies are also important in examining firm and industry efficiency. Since economic efficiency is the ratio, in dollar terms, of output to input, lower average cost means more efficient use of resources when all costs are accounted for and all inputs (resources) used and outputs (products) created are valued appropriately.

Several studies using different approaches indicate that economies of size are present in the beef packing industry. Survivor analysis provides a means of looking at firms' size distribution over time. If larger size categories include more firms over time and smaller size groupings fewer firms, there is presumably a rational

reason. The reason may be the greater profitability of larger firms derived from economies of size. Survivor analysis of 1972-85 data suggests economies of size in beef packing.

Statistical cost studies by Cothorn,¹ analyzing 1976 California data, Glover and Marousek, using 1979 data from six U.S. production regions, and Sersland, using 1985 data, show consistent and similar results. Cost-volume relationships in both beef slaughtering and carcass fabricating (breaking carcasses into boxed primal and subprimal cuts, retail cuts and ground beef) show steadily decreasing average costs for successively larger plants. In the Glover-Marousek study variable costs alone were lower in most instances for larger plants. This is very strong evidence of the existence of economies of size in the beef slaughtering and processing industry. It is reasonable to conclude that size economies are an important reason for the structural change in the industry: the trend toward fewer and larger plants.

External economies of size – the ability to buy inputs at lower cost because of volume and bargaining power, and to promote and market beef more advantageously for the same reasons – may also be important incentives to firm growth. This is especially true for multi-plant operations. Adding more plants does not reduce in-plant average costs; it may reduce procurement and marketing costs and enhance bargaining power. Much less information is available from which to assess the impacts of external economies of size on market structure.

Food Retailing Market Structure

Large food retailers maintain their own warehouse and distribution systems; they buy directly from food processors, including meat packers. Their size and market power (ability to influence price and other terms of sale) are factors in both their buying and selling operations. The largest national food retailing companies include Kroger, Safeway, American stores, Winn-Dixie, Southland Corporation (7-11 convenience stores), A & P, Lucky Stores and Albertson's. Nationally, the four largest retail chains accounted for 18 percent of retail food sales in 1982; the largest eight chains had 25 percent of sales and the largest twenty, 36 percent. While acquisitions and mergers have been rampant in the food processing industry recently (Philip Morris, RJR Nabisco, Kraft, Pillsbury), few have involved the large retailers; Safeway's purchase by SSI Holdings Corporation is the most notable.

Market concentration is much greater in local food markets than nationally, however. The four largest supermarket firms found in each of 240 nonrural areas made an average of 71 percent of total grocery sales in their respective markets. Thus it is apparent that several of the largest food retailing firms have the merchandising volumes that enable them to exert influence in their procurement negotiations, including fresh beef buying.

MARKET CONDUCT: PRICE DETERMINING FACTORS

Beef processors appear to be placing more reliance on USDA Market News Service reports, and less on the National Provisioner "Yellow Sheet" in arriving at their bid price for fed cattle, as compared to a decade ago. Forward contracting is more prevalent and the number of buyers competing for cattle has been reduced in some areas by plant closings and industry restructuring. Other fed cattle market factors continue to play a role in pricing: nearby live cattle futures contracts; lot size; and fed cattle supply, packer slaughter requirements and buyer competition at any particular time and place.

The beef packing industry is dominated by a few large firms, each with the ability to exert market power that can affect the other firms in the industry. Thus the relationship among the companies becomes one of rivalry as contrasted with the impersonal nature of markets with many buyers and sellers. Several different industry behavior patterns can evolve in a few-firm "oligopoly" industry. One firm may become the dominant,

1. The Cothorn and Sersland studies are reported by Ward (1988).

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unofficially recognized price leader (the U.S. Steel or General Motors of earlier times). The major firms may reach an unspoken "live and let live" situation. Or they may continue to challenge one another through pricing and procurement practices, growth through purchase or construction, technological innovation, market area and product development, etc. The Big Three of the beef packing industry appear to continue to be in the challenging phase. And this situation offers the best environment for both those who sell to and those who buy from an oligopolistic industry, in this case beef producers and beef consumers.

Major food retail chains use their large absolute size as a bargaining tool when purchasing fresh beef. They have the market power to set volume, grade, yield, weight and delivery specifications. This matchup of the market power of large processors with that of large retailers has been termed countervailing power. To a degree the beef packers become "price takers" rather than "price makers" in the carcass and boxed beef markets.

In local retail food markets, supermarkets use the advantages of absolute firm size as well as their size relative to other food retailers in that market (market share) when setting price, product, advertising and sales promotion policies. While "specials" are featured, more supermarket marketing strategies tend to be of a nonprice nature: larger and more attractive stores, more selection of both food and nonfood items, more stores (outlets) in a given market. This nonprice competition is typical of more "mature" oligopolistic industries. It is less likely to result in direct retaliation by rival firms, the price wars that price cutting often evokes. The food retailing industry more closely resembles a "live and let live" model. It is relatively stable but yet relatively competitive, although the competition is often not in product prices.

MARKET PERFORMANCE IN THE BEEF INDUSTRY

Performance in food industries has been analyzed mainly from the standpoints of costs and productivity (output per unit of input), referred to as technical efficiency, and prices and profits, or economic efficiency.

Beef Processing Market Performance

Average cost of production differs among beef packing plants. These differences, which may be as much or more than firms' typical profit target of one percent of sales, stem from variations in plant size, layout and operating level. Slaughtering costs have risen over the past two decades but more slowly than other components of the total farm-to-retail price spread. Labor productivity (output per worker) has increased but so have wage rates. The effect of increased market concentration on productivity in the meat packing industry is unclear.

Less uncertain is the relationship between market structure and prices paid for livestock. Buyer competition, as measured by the number of buyers, and price paid are directly related. Two studies have found a negative relationship between regional beef cattle concentration ratios and fed cattle prices; higher concentration was associated with lower prices.

Available data indicate that profit (return on equity) in the meat packing industry is somewhat lower than in other food manufacturing industries and in all manufacturing industries. There is no indication that recent structural changes have affected the profit level in meat packing.

Beef processors have historically viewed their role as converters of a live animal into a carcass or subcarcass. They have not perceived beef processing as creating a product. Hence, they have given little attention to product development, packaging or firm identification of their product. Only recently has one major packer, Excel, undertaken to market vacuum-packed fresh beef carrying Excel brand label through the Kroger retail chain. The outcome of this marketing program is yet to be determined.

Food Retailing Market Performance

Retailing is a labor-intensive activity; food retailing is no exception. The productivity gains that have been achieved in manufacturing have not been realized in merchandising. Food retailers have experienced declining labor productivity in the 1970 and 1980 decades. Hours worked have increased faster than output. With increased wage rates, labor costs per unit of output (sales) have risen. But no analyses have been made to determine whether there is a relationship between productivity, costs and market structure in food retailing.

The shift from carcass beef to boxed beef has reduced the labor demands in retail grocery store meat departments. A further movement to prepackaged shelf-ready retail cuts replaces relatively high-wage store butcher piece-work meat cutting with lower-wage assembly line procedures. But data are not available on the effect of these changes on labor productivity and costs.

There are data on the relationships between grocery prices, profit ratios and retail market concentration. A comprehensive study showed that both prices and profits increased as (1) the shares of the market held by the four largest firms increased and (2) the dominance of a single firm among the largest four became greater. But prices rose faster than profits. The results indicate that market concentration bestows market power by which firms can increase prices, but also that all of the price increase is not allocated to greater profits. Some of the increased revenues are used for other activities and projects, perhaps such things as promotions, fancier stores, higher wages and salaries. Such compromise of cost consciousness conferred by market power is known as "X-inefficiency"; unnecessary costs can be passed on through higher prices.

Profit level of large food retailers equals or exceeds that of other food industries and all manufacturing industries. However, there are rather wide differences among individual firms and from year to year.

IMPLICATIONS: WHAT DOES IT MEAN?

The structure of the beef industry is not unlike that of other agricultural sectors of the American economy: many small firms (beef cattle producers) and households (consumers) at either end of the production-marketing-consumption chain. Between are the segments of the industry where a few large firms dominate the market, primarily beef processing and retailing. (Although there is discussion of cattle feeding being confined to perhaps 1,000 feedlots in the foreseeable future, this would not constitute a highly concentrated industry, provided the firms were owned and operated independently. It could result in some degree of market power in local or regional feeder cattle and fed cattle markets.)

The concentrated market structure of large beef packers and grocery retailers enables them to engage in market conduct directed both toward firms in their part of the industry (direct competitors) and in other parts of the industry (firms from which they buy and firms to which they sell). Among the actions possible are those that further increase concentration (mergers, building new facilities), gaining backward or forward market control through vertical integration or forward contracting and pursuing pricing and other policies that discourage competition, particularly the entry of new firms.

Abuse of market power, as measured by control of prices and excessive profits, does not appear to be a serious problem in the beef industry at this time. The challenge of restructuring in beef processing and the countervailing power between large packers and large retailers probably play a role. The industry's performance regarding progressiveness is more difficult to assess: how to know what may be missing in products or processes that could have, but did not, come into existence.

Countervailing power is not available to individual beef producers and consumers. Group action through associations, cooperatives and government can be effective in furthering producer and consumer interests. The beef promotion program is one such effort. The information the NCA task force is seeking may be another.

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Government at the national level represents the diverse and often conflicting interests of all society. In the area of market structure, conduct and performance, the major elements of government are regulatory activities and antitrust action. Both have been used in the beef as well as many other industries but they have not been particularly active instruments of public policy in recent years.

Perhaps the best prospect for continuing development and progress in the beef industry is a vibrant society. A dynamic economic system helped propel the U.S. to the forefront of industrialized nations. The same approach may offer the surest means both to provide for technological changes in the beef industry and to distribute their benefits throughout society.

A well known industrial organization economist, F.M. Scherer, addressed the question

"...of the most favorable climate for rapid technological change. A bit of monopoly power in the form of structural concentration is conducive to invention and innovation, particularly when advances in the relevant knowledge base occur slowly. But very high concentration has a favorable effect only in rare cases, and more often it is apt to retard progress by restricting the number of independent sources of initiative and by dampening firms' incentive to gain market position through accelerated research and development. Likewise, it seems important that barriers to new entry be kept at modest levels, and that established industry members be exposed continually to the threat of entry by technically audacious newcomers. What is needed for rapid technical progress is a subtle blend of competition and monopoly, with more emphasis in general on the former than the latter, and with the role of monopolistic elements diminishing when rich technological opportunities exist." (Scherer 1980, p. 438)

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