

## Managing for Today's Cattle Market and Beyond

# *Packer Concentration and Captive Supplies*

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Concentration in meatpacking is high, especially for fed cattle slaughtering and fabricating. Use of captive supply methods remained reasonably stable from 1988 to 1994 on an annual average basis. However, captive supply procurement is seasonal and can vary widely from plant to plant and week to week.

Concentration in meatpacking and use of "captive supplies" in cattle procurement have been major concerns to many in the cattle industry in recent years. This fact sheet defines both concepts, provides information on the level and trends in both, and reports on research attempting to determine their impacts.

### *Concentration*

Concentration is defined as a measure of the market dominance of a few large firms. Cumulative market shares by the four, eight, or twenty largest firms are frequently reported measures of market concentration.

High levels of concentration are believed by some to be associated with lower prices paid for inputs (such as fed cattle) or higher prices charged for outputs (such as beef and byproducts). However, concentration does not necessarily indicate noncompetitive behavior (market power) or poor economic performance (low prices paid for inputs or higher prices charged for outputs). Other factors must be considered.

There is little argument that concentration in fed

cattle slaughter and boxed beef production is high. In 1994, the four largest firms combined had an estimated 87 percent of U.S. steer and heifer slaughter and over 90 percent of boxed beef production (Kay). Figure 1 shows how concentration has increased since 1972 (Packers and Stockyards Administration). Note, however, that the four largest firms in 1972 were not the same as the four largest firms in 1994. The combined market share of the four largest firms (equivalent to the four-firm concentration ratio) was relatively flat throughout most of the 1970s. Concentration began increasing in the late 1970s and increased sharply through the 1980s and to date in the 1990s.

Consolidation among meatpacking firms has contributed to increased concentration. In 1987 alone, mergers and acquisitions increased the combined market share of the four largest firms by 12 percentage

Figure 1. Combined Market Share of the Four Largest Firms



points, from 55.1 to 67.1 percent of total fed cattle slaughter (Figure 1).

The three largest firms, sometimes called the “Big 3” because of their combined market share (an estimated 80.5 percent in 1994), have remained the same since a series of mergers and acquisitions in 1987. Another contributing factor to increased concentration has been internal growth by these largest firms.

Why have meatpacking firms increased in size? Why has concentration increased? To answer these questions we need to understand the nature of the meatpacking business. Meatpacking is a margin business. It has often been called a high-volume, low-margin business. In a margin business, if all meatpackers pay about the same price for cattle, labor, and other inputs, and if they all receive about the same price for the sale of meat and byproducts, then their gross margins will be about the same. So the difference between being more or less profitable (i.e. having higher or lower net margins) is their operating costs. Higher cost firms will be less profitable and lower cost firms will be more profitable. To a limited extent, meatpackers do not care whether cattle and beef prices are high or low, only whether or not their gross margin remains about the same over time. If gross margins remain about the same, they can control net margins by managing their costs.

As a result, one of the driving forces in meatpacking is the need to be a low-cost, cost-competitive firm. One way to achieve lower costs is to operate larger, lower-cost plants at capacity. Several research studies dating back to 1962, have shown there are economies of size in cattle slaughtering and fabricating (Ward 1993). Figure 2 shows results from the two most recent studies. The two lines for slaughtering are downward sloping and the two lines

for fabricating are also downward sloping. Both for slaughtering and fabricating, that means as plant size increases, at full plant utilization, average cost per head for slaughtering and fabricating decreases, respectively. Therefore, to be cost-competitive, meatpacking firms operate larger plants.

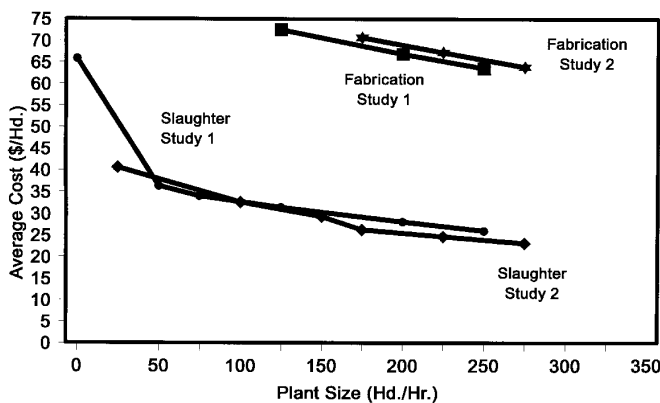
Another factor affecting operating costs is plant utilization. Having a larger plant pays dividends in terms of achieving lower costs per head when there is a high volume of cattle through the plant (or high plant utilization). Research has shown that larger plants have higher plant utilization (Ward 1990; Barkley and Schroeder 1996). To maintain cost advantages over smaller plants, larger plants must operate their plants more efficiently (i.e. at higher levels of utilization).

As a firm expands a plant, say from 0.5 million cattle per year to 1 million cattle per year. The plant experiences lower operating costs. It also means that 0.5 million cattle which were slaughtered by other plants will now be slaughtered in a single plant. The plants losing slaughter to the larger plant experience higher costs because their plant utilization and volume decrease. The result over time is that smaller plants go out of business and concentration in meatpacking increases. When fed cattle supplies approach slaughter capacity, some smaller plants may reopen as occurred in the early 1990s.

Concentration in meatpacking, then, resulted in part from a need for plants to become more cost competitive. Research has clearly shown significant cost efficiencies associated with larger plants. Lower costs mean meatpackers could pay higher prices for fed cattle. Even a \$5 lower average slaughtering-fabricating cost per head potentially could translate into \$0.35-0.50/cwt. higher prices paid for fed cattle.

Profits in meatpacking in the mid-1990s have been double the profit rates for the preceding several years. A long-run profit rate in meatpacking has been a 1 percent return on sales. Sales can be estimated by taking the boxed beef cutout value times the average dressed weight for fed cattle plus the average hide and offal value times the average live weight for fed cattle. Then 1 percent times that figure gives an estimate of average profit per head in fed cattle slaughtering and fabricating. Returning all the higher profits (above a 1 percent return on sales) from meatpackers to cattle feeders in the form of higher prices would mean about \$0.75-1.00/cwt. higher fed cattle prices the past couple years.

**Figure 2. Average Cost Comparisons from Two Studies, by Plant Size**



Impacts of high or rising concentration are difficult to measure. Cattlemen express concerns about: (1) market access or having a market for cattle when cattle reach market weight and finish; (2) adequacy of competition among buyers; and (3) receiving lower prices paid for livestock.

Certainly, fewer meatpackers mean fewer potential buyers. As long as meatpacking capacity exceeds the supply of fed cattle, having a market for cattle may not seem to be a big concern in the industry as a whole. However, for some short time periods and in some local areas, market access may be a real issue.

A major question relates to the adequacy of competition among buyers and the effect on fed cattle prices (Ward 1988). There is evidence from several research studies of small negative impacts on slaughter livestock prices from increased consolidation and concentration. Research has addressed several questions; some focusing on transaction price impacts and some on impacts for prices aggregated over time and over the entire U.S. meatpacking industry.

One line of research has attempted to determine the effects which number of buyers has on livestock prices. Generally, fewer buyers mean less demand for slaughter livestock and less buyer competition, both of which lead to lower livestock prices. Conversely, more buyers generally mean more demand for slaughter livestock and more buyer competition, both of which lead to higher prices. The adoption of electronic markets, giving more buyers better access to livestock offered for sale, has typically resulted in higher livestock prices in several studies. Increased numbers of buyers bidding on fed cattle have had a positive effect on fed cattle transaction prices in several studies.

Researchers have examined the relationship between regional fed cattle prices and meatpacking concentration (Marion and Geithman 1995; Azzam and Schroeter 1991; Slaughter Cattle Procurement and Pricing Team 1996). Higher levels of concentration were associated with lower prices paid for fed cattle in those studies.

Studies examining fed cattle transaction prices found that meatpackers often paid significantly higher or lower prices for fed cattle than competitors or groups of competitors (Ward 1993; Schroeder et al. 1993; Ward, Koontz, and Schroeder 1996). A study conducted after the series of mergers and acquisitions in 1987 found the Big 3 meatpackers paid significantly lower prices for fed cattle in the Southern Plains and in subregions of the Southern Plains than did their

competitors as a group. However, in the same study, plus in a more recent study, differences were found among the Big 3 firms in how much they paid for fed cattle. Each firm did not pay lower prices than other competing firms.

Several studies have estimated aggregated effects from structural changes (Schroeter 1988; Schroeter and Azzam 1990; Azzam and Pagoulatos 1990). One study found monopoly price distortions for wholesale beef. Monopoly price distortions refer to observing higher-than-competitive prices for wholesale meat sold by meatpackers. The same and similar studies also found monopsony price distortions for livestock prices. Monopsony price distortions refer to observing lower-than-competitive prices for livestock purchased for slaughter by meatpackers. Another study used a different statistical technique and found cooperative price behavior among meatpackers in fed cattle procurement (Koontz, Garcia, and Hudson 1993). Such behavior is indicative of oligopsonistic market power or noncompetitive pricing. However, another study suggested that reducing industry concentration would not increase fed cattle prices (Stiegert, Azzam, and Brorsen 1993).

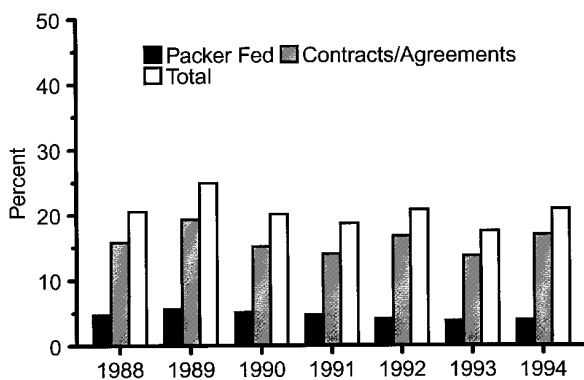
In summary, fewer and larger meatpackers have resulted in increased plant and industry efficiency. Several studies have also suggested that larger meatpackers have exercised a small degree of market power in livestock procurement. One study indicates the “most plausible” estimate of noncompetitive pricing is less than 1 percent of prices paid for livestock (Azzam and Schroeter 1991).

The drive to operate larger, more efficient plants does not explain by itself the increase in firm size and increase in concentration. We noted that internal growth as well as mergers and acquisitions have played a significant role. No research has estimated how large a firm must be (i.e. how many plants are needed) to achieve most cost economies and yet not have excessive, potential market power. Questions are raised about past or current abuses of market power vs. firms positioning themselves in the marketplace so as to apply market power in the future. While research to date generally shows small negative impacts from increased concentration, one recent study showed that the gains from cost efficiencies in meatpacking more than offset any likely market power impacts from concentration (Azzam and Schroeter 1995).

Captive supplies refer to livestock which are committed to a specific buyer two weeks or more in advance of slaughter. The three most common types of captive supply methods include forward contracts, packer feeding, and exclusive marketing/purchasing agreements.

Captive supplies represented 21 percent of fed cattle slaughter on an annual basis for the four largest firms in 1994 (Packers and Stockyards Administration). The next largest 10 or so firms had a lower percentage of captive supplies. Captive supplies are typically higher in Texas-Kansas-Colorado than Nebraska-Iowa. For some plants and some weeks the percent of slaughter may be 70 percent or more. But to have the annual average at 21 percent, captive supplies for some plants and some weeks must be 10 percent or less. Figure 3 indicates the extent of captive supplies on an annual average basis has not varied greatly over the past several years.

**Figure 3. Captive Supplies for the Four Largest Beef Packers**



One point often overlooked in the discussions about captive supplies is why both sides of the market, both buyers and sellers, use them. Both parties to a captive supply agreement, in the case of forward contracts and marketing agreements or formula selling of cattle, must decide that at the time the contracts or agreements begin that positive benefits will accrue to themselves. Below are a list of potential motivations why cattle feeders enter into captive supply arrangements.

**Forward Contracts:**

- Manage risk (basis or price level);
- Obtain favorable financing terms;
- Guarantee a buyer for cattle

**Marketing Agreements:**

- Manage risk (within-week price risk);
- Obtain favorable financing terms;
- Guarantee a buyer for cattle;
- Access carcass information on cattle;

- Move toward value based marketing;
- Reduce the adversarial relationship with packers

**Packer Feeding in Custom Feedlots:**

- Increase feedlot utilization;
- Develop a positive relationship with a packer for other custom or company cattle.

One motivation for packers is increased plant utilization. That increase in plant efficiency and lower plant operating costs potentially could mean \$0.20-0.30/cwt. higher prices paid for fed cattle.

The main point is that there are economic incentives for using captive supply marketing and procurement methods. Those economic incentives apply both to cattle feeders and meatpackers.

**Captive Supply Impacts**

Cattle producers are most concerned about the potential impacts of captive supplies on cash prices. When buyers purchase fed cattle by captive supply methods, the supply of cattle which can be purchased by other buyers is effectively reduced. That by itself would likely raise prices for the remaining cattle. Other buyers, those without captive supplies, need to bid more aggressively for a smaller supply of fed cattle. That, too, should put upward pressure on prices. However, it also means that those buyers which have captive supply cattle, need not be as aggressive in the cash market because they already have a portion of their supply needs met. That in turn may cause them to be less aggressive in the cash market and cash prices may decline. The end result is not clear. Research to date suggests the presence of captive supplies may reduce cash fed cattle prices by a small amount (Ward, Koontz, and Schroeder 1996). Use of captive supplies also reduces the availability of market price information which can be reported, summarized, disseminated, and used by the industry for subsequent price discovery.

Only a few studies have focused on captive supplies or explicitly included captive supplies in studies examining impacts from structural and behavioral changes in meatpacking. One of the first studies on captive supplies estimated the extent of forward contracting (Ward and Bliss 1989). Survey results indicated that 12.7 percent of fed cattle in the major cattle feeding states in 1988 were procured by forward contract. Ninety percent of forward contracting in 1988 occurred in the Plains states (Nebraska, Colorado, Kansas, Oklahoma, and Texas)

and nearly two-thirds of all contracting was found in just two states (Texas and Kansas). Eighty-four percent of forward contracting was by cattle feedlots which marketed 20,000 or more cattle. Nearly all contracting (96 percent) was between cattle feedlots and the Big 3 packers.

Another study examined the effects from forward contracting fed cattle in Texas feedlots (Elam 1992). Results indicated that contract prices were significantly lower than hedge prices for fed cattle. Cattle feeders were giving up a portion of the basis to packers when they forward contracted cattle. This difference was in essence a risk transfer premium from cattle feeders to packers. The same study also estimated the aggregate effect deliveries of captive supply cattle had on fed cattle prices in the U.S. and in four states (i.e. Texas, Kansas, Colorado, and Nebraska). Overall, small negative effects were found. Results differed for individual states, ranging from no significant impacts to significant, negative price impacts in others.

Another study concluded that when transportation costs were waived for cattle feeders, there was no significant difference between contract prices and hedge prices (Eilrich et al. 1990). When transportation costs were not waived, results corresponded with the Elam study, indicating lower prices for forward contracting compared with hedging fed cattle with a live cattle futures market contract. Net basis contract prices and hedged prices both were significantly lower than estimated cash prices for fed cattle. Similar results were found in the Congressionally-mandated Beef Concentration Study (Ward, Koontz, and Schroeder 1996). Forward contract prices were significantly lower than cash market fed cattle prices.

Other research indicated there was a negative relationship between fed cattle prices and packer-controlled supplies over a six-month period (Schroeder et al. 1993). As shipments of captive supply cattle increased, fed cattle prices declined in sampled feedlots. Price impacts differed among packers and subperiods within the six-month period and price impacts were not significant for some packers and time periods.

In the Beef Concentration Study, captive supply impacts were generally negative but small, and potentially so small as to not be economically significant (Ward, Koontz, and Schroeder 1996). Generally, increases in the percentage deliveries of forward contracted cattle were associated with increases in plant utilization, increases in cash market prices, and decreases in basis. Generally, increases in

the percentage deliveries of packer fed cattle were associated with increases in cash market prices, decreases in plant utilization, and declines in futures market prices, though not all coefficients were significant. Increases in percentage deliveries of marketing agreement cattle were consistently associated with increases in cash market prices, decreases in plant utilization, and decreases in futures market prices.

Increasing deliveries of cattle from each of the captive supply inventories were associated with lower transaction prices for fed cattle in two-thirds of the equations estimated. There was generally a small negative effect on cash market transaction prices from meatpackers having an inventory of captive supply cattle from which to deliver cattle for slaughter. The type of captive supply had a differential impact on fed cattle prices.

Negative, significant price differences were found between forward contract prices and cash market prices. No significant price differences were found between packer-fed cattle and cash market cattle. Prices paid for marketing agreement cattle were significantly higher than cash market cattle. If marketing agreements result in better communication between feeders and packers, along with additional information regarding how purchased cattle dressed, then one could expect a positive price difference between fed cattle purchased by marketing agreement compared with those purchased in the cash market. Over time, cattle feeders should use the additional information and improved communications in purchasing feeder cattle and better feeding and marketing fed cattle, which should be reflected in higher prices. Additionally, the incremental information may allow feeders to alter the type of feeder cattle purchased so as to better match the demands of packers when cattle reach market weight and finish. The higher price may represent a quality difference between marketing agreement and cash purchased cattle and may reflect lower transactions costs associated with procuring cattle via marketing agreement.

In summary, the captive supply study conducted as part of the Beef Concentration Study for the Packers and Stockyards Administration was the most comprehensive of any study to date. In that study, a relatively weak negative relationship was found between transaction prices for cash market cattle and either delivering cattle from an inventory of captive supplies or having an inventory of captive supplies from which to deliver cattle at a later time. Prices paid

for forward contracted cattle were significantly lower than for cash purchased cattle and were relatively large (\$3/cwt. on a dressed weight basis). Prices paid for marketing agreement cattle were significantly higher than cash purchased cattle but price differences were not large. Prices for packer fed cattle were not significantly different than cash market cattle.

Over a year-long period, captive supplies may account for about 25 percent of fed cattle slaughter. In some weeks, the percentage is much larger and the percentage is much higher for some plants. One limitation of the most recent captive supply study was not being able to estimate the very short-run effects often described by cattle feeders. When one or more of the largest three-to-five packers have a substantial portion of their slaughter needs for a week or short-term period coming to a specific plant in the form of captive supplies, a series of short-run events may be observed. First, meatpacker-buyers may become much less aggressive in the cash market. Second, buyers may say, in an effort to negotiate lower market prices, that they do not need cattle. Third, the psychological effect on the market may be negative in the short run, until buyers again bid on cash market cattle.

## Conclusions

Concentration in meatpacking is high, especially for fed cattle slaughtering and fabricating. We must not lose sight of the fact that concentration has increased in part as meatpacking firms increased industry efficiency.

Use of captive supply methods remained reasonably stable from 1988 to 1994, but are seasonal and can vary widely from plant to plant and week to week. We must also recognize and accept that captive supplies are thought to be beneficial to the buyer and seller or they would not be used.

Research to date suggests price impacts both from packer concentration and captive supplies have been negative in general, but small. A much larger impact on fed cattle price level results from the large meat supplies and sluggish beef demand in recent years. However, given sluggish beef demand and large supplies of beef, concerns about packer concentration and captive supplies will not likely subside (see Price Determination versus Price Discovery).

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