



# Packer Concentration and Captive Supplies

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Concentration in meatpacking is high, especially for fed cattle slaughtering and boxed beef production. Use of captive supply methods in fed cattle procurement by packers and fed cattle marketing by cattle feeders increased during the last half of the 1990s. Concentration in meatpacking and use of captive supplies have been concerns to many in the cattle industry for several years. This fact sheet defines both concentration and captive supplies, provides information on the level and trends in each, and summarizes research attempting to determine their impacts.

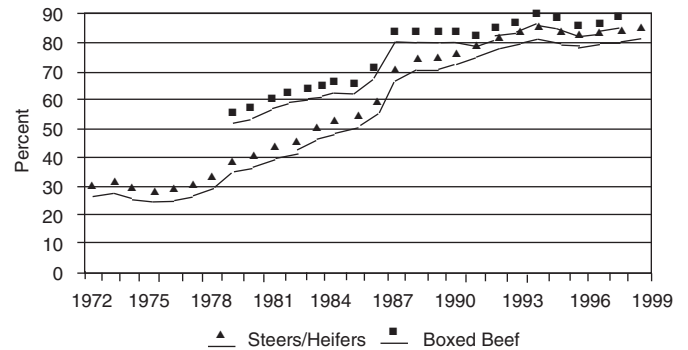
## Concentration

Concentration is defined as a measure of the market dominance of a few large firms. Cumulative market shares by the four largest firms is a frequently reported measure 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 by-products). However, high concentration does not necessarily imply firms will behave in noncompetitive ways (such as the exercise of market power, which may include paying low prices for inputs or charging high prices for outputs). Other factors must be considered.

There is little argument that concentration in fed cattle slaughter and boxed beef production is high. In 1998, the four largest beefpacking firms accounted for an estimated 80.4% of U.S. steer and heifer slaughter (Grain Inspection, Packers and Stockyards Administration) (Figure 1). The same four firms accounted for 85% of boxed beef production in 1998. Figure 1 shows how concentration has increased since the early 1970s. Concentration has remained relatively stable through the last half of the 1990s but at a high level.

Consolidation among meatpacking firms has contributed to increased concentration. In 1987 alone, a series of mergers and acquisitions involving some of the largest beefpacking firms increased the combined market share of the four largest firms by 12% from 55.1 to 67.1% of total fed cattle slaughter (Figure 1). The three largest firms, sometimes called the "Big 3" because of their combined market share, have remained the same since 1987. Another contributing factor to increased concentration has been internal growth by the 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.

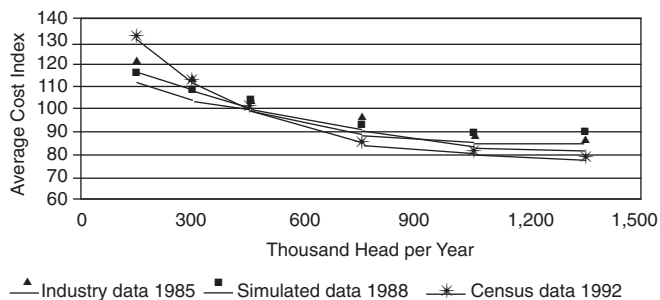
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**Figure 1. Combined Market Share of the Four Largest Firms.**

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 by-products, then their gross margin will be about the same. So the difference between being more or less profitable (i.e. having higher or lower net margin) 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 or increases over time. If gross margins remain about the same, they can control net margins by managing their costs.

During the 1980s and 1990s, one of the driving forces in the meatpacking industry was striving to be a low-cost 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. The most recent study is no exception (MacDonald et al.). Figure 2 shows a comparison of slaughtering-fabricating costs from three studies, including the most recent. All three lines slope downward as annual slaughtering-fabricating volume increases. Stated differently, as volume increases, average cost per head for slaughtering-fabricating decreases. Therefore, to be cost-competitive, meatpacking firms operate larger plants.



**Figure 2. Cost Comparison by Plant Size: Slaughter-Fabrication.**

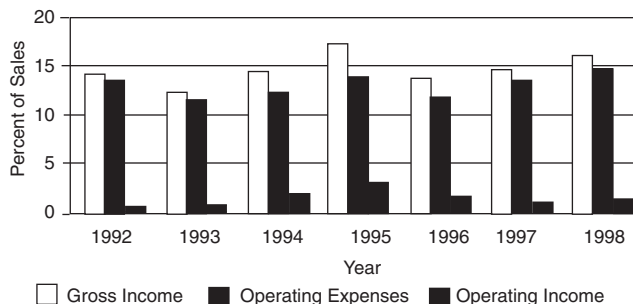
Another key factor affecting operating costs is plant utilization. Having a larger plant pays dividends in terms of achieving lower costs per head when there is a high volume of cattle through the plant (or high plant utilization). Research has also shown that larger plants have higher plant utilization. To maintain cost advantages over smaller plants, larger plants must operate at high levels of utilization.

An increasingly important factor is multi-plant economies of size. Firms operating two or more plants have been thought to have lower costs per unit than single-plant firms. However, no research has estimated multi-plant economies. Food safety regulations, such as HACCP, may be making multi-plant operations even more important. If one plant is closed for food safety reasons, other plants can continue operating, both purchasing cattle and supplying beef and by-products to customers.

As a firm expands a plant, for example 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 previously slaughtered by other plants will now be slaughtered in a single plant. The plants losing slaughter volume to the larger plant experience higher costs because their plant utilization decreases. The result over time is that smaller plants go out of business and concentration in meatpacking increases.

Concentration in meatpacking increased over time so plants became more cost competitive. Research has shown significant cost efficiencies associated with larger plants. Lower costs mean meatpackers can pay higher prices for fed cattle. Even a \$5 reduction in average slaughtering-fabricating cost per head could potentially translate into \$0.35-0.50/cwt. higher prices paid for fed cattle.

Profits in meatpacking in the mid-1990s were several times larger than for just a few years earlier. For many years, a presumed long-run profit rate in meatpacking has been a 1% return on sales. Figure 3 shows the financial performance of the four largest meatpacking firms for much of the 1990s (Grain Inspection, Packers and Stockyards Administration). Net operating income was 0.5% in 1992, 3.3% in 1995, and 1.4% in 1998. Thus, returns vary widely but have averaged higher than the long-run standard. One explanation for the higher returns is a gradual move toward more branded meat production. However, some would argue the higher profit rate is because of increased concentration in meatpacking.



**Figure 3. Financial Performance for the Four Largest Firms.**

Producers need to put large reported packer profits in perspective. First, profits should be converted to a per head or per hundredweight basis to be compared with fed cattle prices. Second, it can be shown that returning all profits to cattlemen above a standard return on sales does not add as much to fed cattle prices as many producers might think. Sales can be estimated by taking the boxed beef cutout value times the average dressed weight for fed cattle, then adding the average hide and offal value times the average live weight for fed cattle. Multiplying that sum by 1% gives a rough estimate of average profit per head in fed cattle slaughtering-fabricating. Returning all the higher profits in 1998 above a 1% return on sales (and nothing indicates that some return above 1% is excessive) to cattle feeders in the form of higher prices would have meant about \$1/cwt. higher fed cattle prices.

Estimated "average" meatpacking profit per head = [(Boxed beef cutout value x Average dressed weight of fed cattle) + (Hide and offal value x Average live weight of fed cattle)] x 1%

### Concentration Impacts

Impacts of high or rising concentration are difficult to measure. Some cattlemen express concern about: (1) limited market access when cattle reach market weight and finish; (2) inadequate competition among buyers; and (3) lower prices paid for livestock.

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 more problematic.

A major concern to some is the potential inadequacy of competition among buyers and the effects on fed cattle prices. Research has addressed several questions related to the competition issue; some focusing on transaction price impacts and impact for prices aggregated over time and the entire U.S. meatpacking industry.

Research has attempted to determine the effects number of buyers has on livestock prices. Generally, fewer buyers and fewer bids translate into slightly lower prices for livestock. More buyers and more bids translate into slightly higher prices for slaughter livestock. The adoption of electronic markets in the

early 1980s, giving more buyers better access to livestock offered for sale, typically resulted in higher livestock prices in several studies. Increased numbers of buyers bidding on fed cattle was found to have a positive effect on fed cattle transaction prices in several studies.

Research has examined the relationship between regional fed cattle prices and meatpacking concentration. In general, higher levels of concentration were associated with lower prices paid for fed cattle. 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. The most recent of these studies found significantly different prices paid over a yearlong period among beefpacking plants and firms (Ward, Koontz, and Schroeder).

Several studies have estimated aggregate effects from structural changes. One of those studies found monopoly price distortions for wholesale beef. Monopoly price distortions refer to observing higher-than-competitive prices for wholesale meat sold by meatpackers. 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. Research has also found cooperative price behavior among meatpackers in fed cattle procurement. 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.

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. The drive to operate larger, more efficient plants does not explain the increase in both firm size and increase in concentration. 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 versus 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, two studies have shown that the gains from cost efficiencies in meatpacking more than offset any likely market power impacts from concentration (Azzam and Schroeter; Paul).

Overall, the research has not been conclusive. A review of work by Grain Inspection, Packers and Stockyards Administration (1996) found the extensive literature to be inconclusive. Research since that time has not been conclusive either. Some would suggest more work is needed but data limitations are one problem with doing further work. Regulatory agencies may need to become more involved in research to obtain the necessary data. Some economists argue new approaches are needed to address this issue.

## Nature and Extent of Captive Supplies

Captive supplies refer to livestock that are committed to a specific buyer two weeks or more before slaughter. The three most common types of captive supply methods include packer feeding, forward contracts, and marketing/purchasing agreements. A common element of the three types is that meatpackers have a portion of their slaughter volume needs purchased weeks or months prior to the livestock being slaughtered. Forward purchases enable meatpackers to plan cash market purchases and deliveries in coordination with purchases by captive supply methods.

Captive supplies represented 22.4% of fed cattle slaughter on an annual basis for the four largest beefpacking firms in 1998 (Grain Inspection, Packers and Stockyards Administration) (Figure 4). Contracts accounted for 18.9% of captive supplies and packer feeding 3.5%.

In Figure 4, the fourth and far-right bar beginning in 1994, and shown for 1994 to 2000, is for data from another source. The Agricultural Marketing Service of the U.S. Department of Agriculture reported weekly the “additional movement” of fed cattle. This is a category of shipments that are not cash-market trades and are often mistakenly called captive supplies. Some portion of these trades are captive supplies, but some are not. The annual average percentage of additional movement of fed cattle began slightly below the annual average of captive supply cattle in 1994. However, the percentage has increased

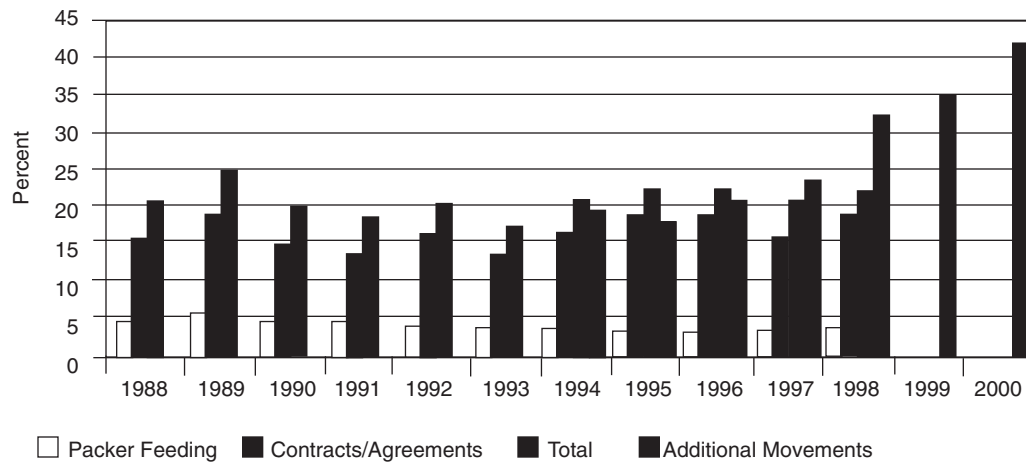


Figure 4. “Captive Supplies” for the Four Largest Beef Packers.

sharply. In 1998, the most recent year the AMS data can be compared with GIPSA data, additional movements averaged 32.4%, which was 10% above the GIPSA captive supply percentage, and that percentage grew in 1999 and 2000.

What explains the difference in the two data series? Grid pricing has increased rapidly in the latter half of the 1990s. Part of the additional movement data includes grid priced cattle in which the base price is a formula. These trades may not have been made two weeks or more prior to shipment, thus do not fit the strict definition of captive supplies used by GIPSA. Figure 5 shows the upward trend since 1994. Whether these are strictly captive supplies or not, they represent a growing share of fed cattle trades. In some weeks, additional movement of fed cattle represents the largest share of cattle shipped to packers for slaughter.

One point often overlooked in the discussions about captive supplies is why both buyers and sellers use them. Both parties, in the case of forward contracts and marketing agreements or formula selling of cattle, must decide at the time the contracts or agreements begin that positive benefits are expected to accrue to themselves. Table 1 summarizes potential incentives of cattle feeders and meatpackers to enter into particular captive supply agreements (Schroeder et al.). Primary benefits to cattle feeders may include improved price risk management, access to more financing options, a guaranteed buyer for cattle, improved opportunity for carcass quality premiums, and reduced marketing costs. Packers' primary benefits include securing cattle slaughter volume so they can operate large packing plants near capacity, having more control over the type and quality of cattle to fill their plants, and reducing procurement costs.

Some captive supply agreements are a step toward value-based marketing of live cattle. Captive supply agreements containing price adjustments for varying carcass qualities provide cattle feeders increased incentives to produce cattle possessing desired characteristics. One motivation for packers is increased plant utilization and efficiency. Increased plant efficiency and lower plant operating costs potentially could

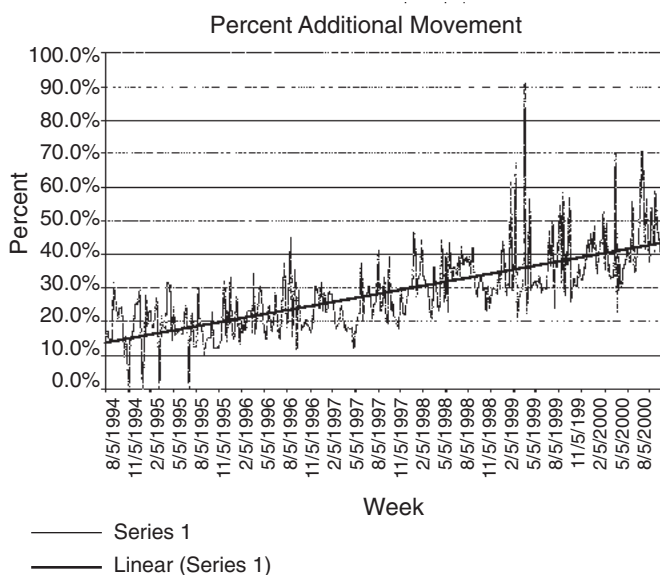
mean \$0.20 to 0.30/cwt. higher prices paid for fed cattle. A key point is that there are economic incentives for using captive supply marketing and procurement methods. Those economic incentives apply both to cattle feeders and meatpackers.

## Captive Supply Impacts

The possible impacts captive supplies have on competition and cash prices are important to cattlemen. When buyers purchase fed cattle by captive supply methods, the supply of cattle purchased by other buyers is reduced. This 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 should put upward pressure on prices. However, it also means that buyers that have captive supply cattle are not as aggressive in the cash market because they already have a portion of their cattle requirements met. That in turn may cause them to be less aggressive in the cash market and cash prices may decline. Therefore, the end result is not clear. The captive supplies project of the Congressionally-mandated packer concentration study consisted of two components, one estimating long-run impacts from captive supplies and the other estimating short-run impacts. In examining monthly captive supply data, research found that forward contracting (including here marketing agreement purchases) and packer feeding varied greatly among plants (Barkley and Schroeder). Use of captive supplies was higher for large plants compared with small plants. Average monthly captive supply purchases were nearly three times higher for larger plants (17,872 and 5,818 head per month, respectively, across all plants). Larger plants also had higher plant utilization than smaller plants. Use of packer feeding was relatively constant during the year, whereas use of forward contracts and marketing agreements was more variable, increasing in April, June, and December.

Results from a captive supply model suggested that larger plants use captive supplies strategically. Captive supply usage by larger plants increased as cash prices increased. Captive supply usage increased as cash price variability increased, more so for larger plants than smaller plants. Captive supply usage also increased as plant utilization increased. Larger plants contracts and marketing agreements were substitutes for packer feeding. Therefore, in summary, larger plants used captive supplies to increase plant utilization and mitigate rising or more variable prices. Cattle availability over the five-year data period did not affect captive supply levels.

In one of the short-term impact approaches, results indicated that the decision to deliver forward contracted and marketing agreement cattle and the decision to purchase cash market cattle were interdependent (Ward, Koontz, and Schroeder). The same simultaneity was not found for packer fed cattle. This suggests packers feed cattle for different reasons than they use contracts and marketing agreements. Packer feeding may be motivated more by cattle feeding profit opportunities and maintaining a steady flow of cattle to the plant, and less by using packer fed cattle strategically to reduce procurement costs via its influence on cash market prices. Use of captive supplies was associated with lower prices for fed cattle generally. But the amounts were smaller than many cattlemen expected, ranging from \$0.01-\$0.41 per dressed hundredweight.



**Figure 5. Actual and Trend in Weekly “Additional Movement” of Fed Cattle.**

**Table 1. Summary of Potential Incentives to Enter into Captive Supply Agreements.**

Method of Captive Supply	Cattle Feeder Benefits	Meatpacker Benefits
<u>Forward Contracts</u>	<ol style="list-style-type: none"> <li>1. Reduce price risk if cattle are hedged or flat priced</li> <li>2. Obtain favorable financing</li> <li>3. Ensure a buyer for cattle</li> <li>4. Reduce marketing cost</li> </ol>	<ol style="list-style-type: none"> <li>1. Secure slaughter needs</li> <li>2. Secure quality supply</li> <li>3. Reduce procurement costs</li> <li>4. Reduce price risk</li> </ol>
<u>Marketing Agreements</u>	<ol style="list-style-type: none"> <li>1. Premiums for some cattle quality characteristics</li> <li>2. Obtain carcass information</li> <li>3. Ensure a buyer for cattle</li> <li>4. Reduce marketing costs</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase cattle/beef quality control</li> <li>2. Secure slaughter needs</li> <li>3. Reduce procurement costs</li> </ol>
<u>Packer-Owned Feeding</u>	<ol style="list-style-type: none"> <li>1. Increase feedlot utilization</li> <li>2. Improve packer to feedlot relationship</li> </ol>	<ol style="list-style-type: none"> <li>1. Secure slaughter needs</li> <li>2. Increase cattle/beef quality control</li> </ol>

Since the GIPSA concentration study, economists have continued wrestling with the captive supplies issue. At least three research articles develop a “theory” of captive supplies. While there are differences, all seem to suggest captive supplies can be used strategically by packers. GIPSA has since conducted further empirical work, though with less data and from a smaller geographic area than in their 1996 study. Schroeter and Azzam (1999) found results similar to Ward, Koontz, and Schroeder (1996). Captive supplies were associated with a small negative decline in fed cattle prices. However, they develop an economic argument indicating why this may occur. Further, they stop short of suggesting that regulatory policy be based solely on the negative relationship found between fed cattle prices and captive supplies. Again, many would respond that further research is needed.

## 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. Research to date suggests price impacts from packer concentration have been negative in general, but small. Also, research shows that efficiency gains from moving to fewer and larger meatpackers have more than offset any market power impacts.

Use of captive supply methods remained reasonably stable from 1988 to the mid-1990s. Captive supply usage has a seasonal component and can vary widely from plant to plant and week to week. Evidence suggests captive supplies increased in the last half of the 1990s. Buyers and sellers use captive supplies for various reasons but most believe they are beneficial or they would not be used. Research suggests that larger plants make greater use of captive supply procurement methods to keep plant utilization high. Evidence suggests larger plants use captive supplies strategically, i.e., increasing

the use of captive supplies as cash market prices and price variability increased. Price impacts from captive supplies have been negative in general but small.

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