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Institute Paper 90-01

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Abstract

Buyer Concentration in Feeder Cattle Markets

Initial measures of buyer concentration levels in two major feeder cattle markets are reported. Buyer concentration levels in feeder cattle markets appear to be large and some weak evidence that concentration levels have increased since 1987 was found. Concentration levels vary seasonally and appear to be a function of the types of buyers (feedlots, farmer feeders, etc.) participating in the markets.
Buyer Concentration in Feeder Cattle Markets

Little information is available regarding buyer concentration levels in feeder cattle markets and how concentration has changed over time. If, as Ward has stated, "Research into structure, conduct and performance aspects of meatpacking and related livestock pricing and price reporting areas has been and is woefully inadequate" (pg. 13) then research about the structure conduct and performance of feeder cattle markets is even more so. Much more information is available about slaughter cattle because of government inspection and reporting procedures. Also, feeder cattle are more dispersed than feedlots and meat packing plants on a volume basis which makes gathering information on buyers and sellers more difficult.

Mergers in meat processing and an increase in the number of large feedlots (Figure 1) have led to renewed concern about the possible impact on prices of increasing buyer concentration. For example, the four-firm concentration ratio (CR₄) for steer and heifer slaughter increased from 46.6% to approximately 70% (USDA, P & SA) between 1983 and 1983. Smaller numbers in processing and feeding probably have led to increased buyer concentration in feeder cattle markets also.

The operators of feeder cattle auctions need to know if concentration levels have changed over time since if a problem exists because of concentration levels they may be able to take actions to reduce buyer concentration. Producers in local markets have long suspected that high concentration among local buyers has contributed to market power. However, if increasing concentration in large cash markets for feeder cattle is occurring then these phenomena may have implications for cattle markets in general.

3
Figure 1.
Number of Feedlots With Over 32,000 Head Capacity in the Thirteen Major States.

Source: WLMIP
One of the most difficult problems facing researchers examining the influence of market concentration on market performance is obtaining reliable data. The data set presented here is one of the few available that provides accurate information about buyer concentration in feeder cattle markets, not only in a traditional auction, but also in an auction using anonymous bidding. The two auctions analyzed here probably represent the two largest cash markets for feeder cattle in the country. Consequently, this information should provide, in large part, a good overall measure of the impact of concentration on feeder cattle markets.

The goals of this research are to provide an initial measure of buyer concentration in two large feeder cattle markets and to determine if the level of concentration in these two markets has changed significantly during the past three years. This information will provide an indication of the reaction of feeder cattle markets to the changes that are occurring further along the marketing channel. The two markets that were selected for this analysis represented the largest traditional regional auction in the United States (Oklahoma City National Stockyards) and the largest satellite video auction (Superior Livestock Auction in Brush, Colorado). Reporting concentration in two different types of markets added another dimension to the analysis since the number of buyers, areas served, and bidding methods for the two auctions were different.

Data and Methods for Measuring Buyer Concentration Levels

Both the Oklahoma National Stockyards Company (OKC)\(^1\) and the Superior Livestock Auction (SLA) were requested to provide information regarding the level of concentration.

\(^1\) A division occurred at the Oklahoma National Stockyards Company in April of 1989 and a competing auction was established in Oklahoma City. This may influence the future level of concentration at this market.
buyer purchases through their respective firms. OKC provided information on a monthly basis between January 1988 and July 1989. SLA's information was on an individual sale basis between January 21, 1987 and November 4, 1989. SLA held 14 sales during each of the three years (1987, 1988, and 1989). Information on SLA's last sale in December 1989 was not available so a total of 41 SLA sales were analyzed. SLA usually held sales once per month except during seasonally high volume periods like September and October. When SLA held more than one sale per month buyer concentration levels were calculated on a monthly basis by pooling all SLA sales within that calendar month. Thus matching SLA's data with OKC's.

The buyer information for SLA used in the analysis presented in this paper is preliminary. Some buyers purchased under more than one company name and these inconsistencies need to be resolved. While this is not to be expected to have major impacts on the results, it suggest SLA's actual concentration levels are higher than those reported here. Consequently, direct comparisons between concentration levels at the two markets should be made with caution until final adjustments to SLA's buyer information are made.

The level of buyer concentration in any market is a function of the total number of buyers participating in that market since as the number of buyers in a market increases sales become more dispersed. Economic theory also suggests the total number of buyers participating in a market influences the level of competition in that market (Henderson and Quandt). Three regional markets and SLA were requested to provide information about the average number of buyers attending sales and the average number of buyers buying relatively large volumes of cattle on a regular basis (major buyers). This helped define how many were participating in each type of auction and hence, was a proxy for the relative level of competition in the markets.
Market concentration can be measured by several different methods and two methods of measuring buyer concentration are reported in this paper. The first method, the four-firm concentration ratio ($CR_4$), is a partial index of concentration that indicates the market share for the four largest firms in a particular market (Koch). The $CR_4$ is one of the most commonly used measures of concentration (Marion, et al). It requires knowing the size of the total market and the market shares of the largest firms. It does not require that the market share of all firms be known.

A summary index is also reported for buyer concentration in these two markets. A summary index measures the relative concentration of all firms in a market rather than only a portion of them. (Koch, pg. 177). One summary index is the herfindahl index which is defined as follows:

\[
HI = \sum_{i=1}^{N} \left( \frac{X_i}{T} \right)^2
\]

where $HI$ is the herfindahl index, $N$ is the number of firms in the market, $X_i$ is the absolute size of individual firm $i$ and $T$ is the total size (volume) of the market (Koch). The herfindahl index gives a measure of the dispersion and size of firms in a market and its value ranges between 0 (atomistic competition) and 1 (monopsony).

These two measures of concentration ($CR_4$ and $HI$) were calculated for OKC and SLA. The average of these measures by month and year over the study period were also calculated to determine the level of seasonality and trend in buyer concentration in the markets.
Results

Three major traditional regional auctions (OKC; Dodge City, Kansas; and Greeley, Colorado) and SLA were requested to report the average number of buyers participating in their auctions. These figures are presented in Table 1. The regional auctions reported very similar numbers for the average number of buyer attending each sale (between 30-50) and the number of major buyers attending each sale (15-20). More buyers viewed SLA’s sales (225) than the regional auctions, on the average, and more major buyers also participate in the video auction (30). SLA holds only periodic sales and tends to have more volume on a per sale basis than the regional auctions and SLA sells cattle from a wider geographic area which should attract more buyers. Also, buyers do not need to travel to a central location to bid for cattle offered for sale through SLA since bidding may be done remotely by telephone while the buyer views the auction via satellite transmission which encourages more buyers to participate.

Because of the wide geographic area served by SLA transportation costs may preclude some buyers from actually competing for individual lots even though they are participating in the same auction. Consequently, it is difficult to judge the relative level of competition in the two markets simply by the number of buyers participating. A more thorough analysis would investigate the impact on price of the different concentration levels in the two markets before any conclusion about relative competitiveness could be reached. These results illustrate that relatively few major buyers for feeder cattle exist in the major markets. However, no information was available to measure the number of major buyers in these markets over time.

Table 2 reports the average values for the CR4’s and HI’s at OKC and SLA. The CR4 appears to have increased during the past three years with the exception of 1988 when the CR4 were actually lower. The CR4’s were about 2% higher at SLA in 1987 than in 1989
Table 1. Average Number of Buyers and Estimated Commissions for Regional and SLA Auctions, 1987.

<table>
<thead>
<tr>
<th>Day of the Week Most Sales Held</th>
<th>Average Number of Buyers Viewing Auction</th>
<th>Major Buyers Attending&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Sales Commissions and Other Deductions For Yearling Steers</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLA&lt;sup&gt;b&lt;/sup&gt; Saturday</td>
<td>225&lt;sup&gt;c&lt;/sup&gt;</td>
<td>30</td>
<td>2% of Gross Sales + 1.50/head</td>
</tr>
<tr>
<td>OKC&lt;sup&gt;c&lt;/sup&gt; Monday</td>
<td>30</td>
<td>15</td>
<td>$7.34/head</td>
</tr>
<tr>
<td>Greeley&lt;sup&gt;d&lt;/sup&gt; Tuesday</td>
<td>50</td>
<td>15</td>
<td>2% of Gross Sales + 1.50/head</td>
</tr>
<tr>
<td>Dodge City&lt;sup&gt;e&lt;/sup&gt; Wednesday</td>
<td>50</td>
<td>20</td>
<td>$7.20/head</td>
</tr>
</tbody>
</table>

<sup>a</sup>Buyers who frequently buy relatively large numbers of cattle.

<sup>b</sup>Estimates provided by SLA.

<sup>c</sup>Average number of registered buyers with SLA. Of this number, 60-80 will actually buy cattle at an average sale. During 1988, 1,507 sellers consigned cattle to SLA and 372 different buyers purchased cattle.

<sup>d</sup>The $1.50 per head is estimated cost of beef board deduction and inspection.

<sup>e</sup>Estimates provided by Oklahoma National Stockyard Company for yearling steers.

<sup>f</sup>Estimates provided by Greeley Producer Livestock Auction.

<sup>g</sup>Estimates provided by Dodge City Winter Feeder Cattle Auction.
for the twelve month average but were about 7% higher during the first seven months of 1989 than the first seven months of 1987.

The CR_4's for OKC were larger than SLA in all cases. But, again, the figures in Table 2 can only be compared between markets with caution. The CR_4 for OKC was about 4% larger for the first seven months of 1989 than the corresponding period in 1988. These concentration levels would be considered relatively high when compared with other industries but are still lower than the levels for beef processing.

The herfindahl index suggests that buyers became slightly larger and less dispersed between 1987 and 1989. On a percentage basis this has been more dramatic than the change in the CR_4's. For example, the HI for SLA increased by 21.5% (from .076 to .092) between 1987 and 1989 (Table 2) while the HI for OKC increased by about 16% between 1988 and 1989 (from .115 to .133). This reflects not only a growth in market share for the four largest firms but also suggests that all firms have become relatively larger and/or fewer on the average, than in the past. This is likely due to some consolidation in feedlots but this is not tested directly here.

Seasonality affects concentration levels at both auctions. Concentration levels are relatively large in the first six months of the year (Figures 2 and 3). Interestingly, this phenomenon appears to mirror the seasonality of cattle placed on feed during the study period (USDA, NASS). With fewer and larger feedlots buying feeder cattle this implies that large buyers (feedlots) purchase larger volumes during the first half of the year. Placements are usually lowest during August - October (sales 8 - 11 for SLA) indicating less participation by feedlots in the market during that part of the year and, subsequently, lower concentration levels.
Table 2: Average Four-Firm Concentration Ratios and Herfindahl Indicies, 1987-89

<table>
<thead>
<tr>
<th>Year/Location</th>
<th>Measure of Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CR₄</td>
</tr>
<tr>
<td><strong>12 Month Averages</strong></td>
<td></td>
</tr>
<tr>
<td>SLA:</td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>42.7%</td>
</tr>
<tr>
<td>1988</td>
<td>38.8%</td>
</tr>
<tr>
<td>1989</td>
<td>44.7%</td>
</tr>
<tr>
<td>OKC:</td>
<td></td>
</tr>
<tr>
<td>1988ᵃ</td>
<td>56.2%</td>
</tr>
<tr>
<td><strong>- Average for First Seven Monthsᵇ -</strong></td>
<td></td>
</tr>
<tr>
<td>SLA:</td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>43.8%</td>
</tr>
<tr>
<td>1988</td>
<td>42.2%</td>
</tr>
<tr>
<td>1989</td>
<td>50.5%</td>
</tr>
<tr>
<td>OKC:</td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>59.9%</td>
</tr>
<tr>
<td>1989</td>
<td>63.6%</td>
</tr>
</tbody>
</table>

ᵃ 1988 was the only year when 12 months of information was available for OKC.

ᵇ Information for the first seven months of 1988 and 1989 was available for OKC. The averages for the first seven months are consequently calculated for both auctions to give more information for comparisons.
Figure 2.

Four-Firm Concentration Ratios For Oklahoma City Feeder Cattle Auction

Source: Oklahoma National Stockyards Co.
Figure 3.

Average Four-Firm Concentration Ratio for SLA by Sale 1987-89.

Source: SLA (Preliminary Est.)
The volume of cattle offered for sale was highest for OKC during the Spring of 1988 and 1989 while SLA's volume was highest in the fall (September and October). Consequently, SLA sells proportionately more calves than OKC (i.e., under 600 lbs.) which may help to explain SLA's smaller concentration measures since the SLA probably is not as dominated by feedlot buyers. Some of SLA's lowest volumes of sales were for their November auction (sale 13). This is also when SLA's concentration measures were highest. This may indicate that there is a smaller number of buyers participating in these sales when volumes are small which increases concentration.

Summary and Conclusion

Buyer concentration levels in feeder cattle markets are large relative to other industries. Also, there is some evidence, though not strong, that buyer concentration levels in feeder cattle markets are increasing probably reflecting the changes in the number of feedlots and subsequent change in the number of buyers purchasing feeder cattle. While the video auction appears to be less concentrated, the differences in concentration levels between the two markets are probably not large. A relatively small cadre of major cattle buyers exists though this group is probably larger than for other agricultural commodities such as cotton or poultry.

Concentration levels vary seasonally probably as a function of the types of buyers participating in feeder cattle markets. Concentration levels are highest in the Spring when placements in feedlots are the largest and lowest when larger numbers of calves are being offered for sale such as in the fall. Concentration levels also appear to rise when small volumes of cattle are offered for sale.
Further investigation could examine these hypotheses by testing the impact on price of not only overall concentration levels but also concentration levels by sex and weight category and type of buyer (feedlot, order buyer, or farmer feeder). This would determine if reductions in the overall number of buyers is affecting the level of competition and hence prices in feeder cattle markets for specific types of cattle such as those likely going directly into feedlots.
References

Dodge City Winter Livestock Feeder Cattle Auction. Personal communication. February 1990.


