Exploring the Impact of Fed Cattle Grade on Transaction Type



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Abstract

In this paper, we present price and transaction information of fed cattle marketings to explore if differences exist in the quality grade of cattle marketed under different transaction types. In particular, we explore regional differences in marketings for cash, formula, forward, grid, and negotiated grid transactions from 2012 to 2022. Analysis shows that despite an industry trend toward higher-quality grade animals, most low-quality grade cattle are marketed in Texas, Oklahoma, or New Mexico using non-negotiated pricing methods.

INTRODUCTION

As part of the geographically distinct cattle supply chain that moves animals from birth on disparate cow-calf operations across the continental United States (U.S.) to slaughter facilities concentrated in the middle of the country, fed cattle are considered live animals that have reached a desired weight to be slaughtered. Often, the overwhelming majority of animals are slaughtered in Colorado, Iowa-Minnesota, Kansas, Nebraska, and Texas-Oklahoma-New Mexico. The cattle slaughter industry is also considered relatively concentrated according to numerous measures of market concentration (MacDonald et al., 2000), with 71.7% of all federally inspected cattle being processed in just 22 plants (Ma and Lusk, 2021).

Unlike other industries, fed cattle can be marketed as either negotiated (cash or grid) or non-negotiated (formula or forward), and differences exist across the U.S. as to how cattle are marketed. The main reported difference between the transaction types is how price is determined. Non-negotiated transactions (formula or forward) are often set with base prices that are then adjusted for different traits, including quality. A common method for establishing the base price of non-negotiated transactions is using the previous week's negotiated price arising from cash or grid transactions. As a result, characteristics of cattle marketed through negotiated transactions influence the value of cattle marketed through non-negotiated means in subsequent weeks and can be considered as price discovery for the market.

These different transaction types have generated interest to understand patterns and trends in marketing (Anderson, McKenzie, Mitchell, 2021), with fed cattle transaction information reported through the Livestock Mandatory Reporting Act (LMR). Growing out of increasing concern for market concentration and price discrimination in the livestock slaughter and packing sectors, the LMR Act of 1999 requires packers to provide information about transactions to the United States Department of Agriculture (USDA) for reporting purposes.

Through analysis of this data, changes to percent of total transactions arising from either transaction type over time and differences across U.S. regions has been observed but research has not addressed any issues related to the underlying differences in cattle marketed through either transaction. The detailed data reported through the LMR provides an opportunity to ask questions related to the influence of market power and concentration. Other research has looked at price spreads and marketing margins (Lusk et al., 2021) or the impact of COVID-19 on fed cattle markets (Martinez et al., 2021). Due to the complexity of the dataset, more advanced and sophisticated methods such as hedonic models have been used in addition to more basic graphical techniques (Schroeder, Coffey, and Tonsor, 2023) to answer pertinent research questions (Ward, Schroeder, and Feuz, 2004). However, the dynamic interaction of the two transaction types warrants a review of the characteristics of cattle marketed through each type that has not been clearly and succinctly addressed in previous work.

This research seeks to add to current research on fed cattle transactions through explicitly considering the quality grade of cattle marketed under each transaction type. Specifically, we seek to determine if there is a difference in the quality of cattle marketed under negotiated versus non-negotiated transactions. Anecdotally, cattleman believe that there is a difference in quality premium depending on how cattle are marketed. While there is little evidence to date suggesting differences in cattle quality marketed under each transaction type, the interdependent nature of the transactions, known differences in cattle quality regionally, and changes to transaction type over time suggests that potentially, there might be a reason to suggest that patterns have developed where lower quality cattle are marketed more frequently under a specific transaction type.

METHODOLOGY AND DATA

Weekly fed cattle transaction data were gathered from the USDA Agricultural Marketing Service Datamart from 2012-2022 and summarized to include number of head marketed at a specified weighted average price for that week. Transactions were then summarized for each of the regions within five areas: Colorado (CO), Iowa-Minnesota (IA-MN), Kansas (KS), Nebraska (NE), and Texas-Oklahoma-New Mexico (TX-OK-NM). From there, the type of transaction was indicated as cash, formula, forward, grid base, and negotiated grid (Figure 1).

Transaction data are typically recorded for cattle at the time of slaughter at federally inspected packing plants as part of the LMR reporting process (USDA, 2020). Before cleaning, the dataset used in this research included approximately 92% of the cattle purchased for slaughter in the U.S. and reported at the location of slaughter (USDA, 2020). For this reason, it is important to note that regions are defined as slaughter locations and do not necessarily reflect where the animals were born or fed before transportation to be slaughtered. The major components of reporting include weighted average price and the number of head slaughtered in a specific time period.

Weighted average prices and number of head marketed are reported here based on quality grade, class descriptions, and basis descriptions, with quality defined for the lot as over 80% choice, 65-80% choice, 35-65% choice, and 0-35% choice. Class was described as either heifer, steer, or mixed heifer/steers. This excluded other recorded classes such as dairybred steer/heifer or mixed steer/heifer/cow. As such, this analysis focused on beef cattle specifically and did not include dairy animals. Pricing was also reflective of the animal being dressed as carcass weight or live weight and priced either delivered to the plant or free on board (FOB).

A total of 188,286,226 head were marketed and their data recorded and reported through the LMR through this period, with the number of animals marketed through formula pricing increasing over time. This formula is “the advance commitment of cattle for slaughter by any means other than negotiated, negotiated grid, or forward contract” (USDA, 2020). Forward contracting involves an animal marketed in advance of slaughter, with a base price calculated off of futures prices—note, this has declined slightly over time. Generally, formula and forward contracts are considered non-negotiated.

Negotiated transactions include cash and negotiated grid pricing, with negotiated grid pricing being where a base price (negotiated base) is negotiated by buyer and seller in advance of slaughter with premiums and discounts applied after carcass grading has occurred and a net price is reported. The number of animals priced based on either negotiated grid or negotiated base is the least used transaction type, although more animals have been marketed this way since 2020, surpassing the number of animals marketed through forward contracting in recent years.

While formula pricing remains the most prevalent across all cattle marketed, there were differences

observed in transaction types among regions (Table 1). Specifically in Iowa-Minnesota and Nebraska, cash transactions either made up almost the same or a greater percentage of the total head marketed as formula transactions. It can also be seen that forward contracts were used to market a greater share of cattle in Colorado, Iowa-Minnesota, and Nebraska than in Kansas or Texas-Oklahoma-New Mexico. Further, while other transaction types were present in Colorado and Texas-Oklahoma-New Mexico, 78% and 80% of animals were marketed using formula pricing, showing just how prevalent this pricing strategy is for many cattle.

RESULTS AND DISCUSSION

From 2012-2022, cattle expected to grade lower quality (0-35% choice and 35-65% choice) were priced using a formula method more frequently than other transaction types (Table 2). While cattle in the lowest grade (0-35%) only made up 2% of total head marketed, 75% were priced using formula pricing, 10% were priced with a forward contract, 10% were priced with negotiated grid, 2% cash, and 2% grid based. A similar pricing pattern was present for cattle expected to grade 35-65% choice, with 69% of animals priced with formula pricing and 8% priced through forward contracts. For these animals, 16% were priced via cash methods and 3% through negotiated grid. These transactions represented 21% of animals marketed from 2012-2022.

In contrast, cattle expected to grade higher (65-85% choice or over 85% choice categories) were also priced through formula methods (59% and 57% respectively); however, these animals were also more likely to be priced via cash pricing methods. For animals expected to grade as higher quality, 27% of the 65-85% choice animals and 26% of the over 85% choice animals were priced through cash methods. Consistent with lower quality animals, forward contracts priced 8% of animals while grid base and negotiated grid pricing represented 3-5% of animals marketed.

Contrary to anecdotal evidence or suspicions, cattle expected to grade lower or representing lower quality grade animals, have historically been priced using non-negotiated methods (formula and forward contracts) compared to cattle expected to grade higher which historically have been priced in greater proportion via negotiated methods (cash and negotiated grid).

In addition to recognizing that the majority of cattle expected to grade lower are marketed through non-negotiated pricing mechanisms, there is also an inherent time and spatial component to understanding general pricing trends. From 2012-2022, the industry saw a movement toward higher quality animals and a substantial decline in the number of animals expected to grade 0-35% choice or 35-65% choice (Figure 2). While the number of animals expected to grade 65-85% choice stayed relatively constant over this period, there was an increase in the number of animals marketed overall but also in the number of animals expected to grade over 80% choice.

Further, cattle quality grade is not consistent across regions of the U.S. From 2012-2022, 78% of the cattle expected to grade either 0-35% choice or 35-65% choice were marketed in either Kansas or Texas-Oklahoma-New Mexico, with over 54% coming from Texas-Oklahoma-New Mexico alone (Table 3). Of all the cattle expected to grade 0-65% choice from 2012-2022, 42% came from Texas-Oklahoma-New Mexico and were priced through formula transactions. In some regions, such as Iowa-Minnesota and Colorado, which combined, only marketed 9% of the lower quality cattle, only 1% of animals were priced through cash, negotiated grid, or grid base pricing mechanisms. This further supports the finding that, in general, lower quality grade animals are priced through non-negotiated transactions and does not support the hypothesis that lower quality grade cattle are marketed in a way that deviates from the dominant transaction type for the region.

IMPLICATIONS AND CONCLUSIONS

The LMR and the associated price and slaughter information that have resulted from this reporting allows for in-depth analysis of transaction characteristics through time. This research shows that despite suspicions, lower quality grade cattle were not priced differently than the broader slaughter cattle population. In fact, lower quality grade cattle originate in regions of the country such as Texas-Oklahoma-New Mexico that more frequently market cattle by formula pricing mechanisms, a non-negotiated pricing strategy. Through this research, no deviations were found in the distribution of pricing methods for low-quality cattle.

This research only considered the number of animals priced under each transaction type. Due to the amount of data available through the LMR and associated pricing reports, more detailed analysis could be completed to further analyze price differences between grade categories. Given

the dynamic and interconnected nature of pricing methods, understanding price transmission across the industry and among regions remains an interesting and unexplored area of research. As shown, quality grade differences in cattle across regions remains an inherent integrated component to pricing. A further in-depth analysis of pricing methods to include class basis (dressed versus live, delivered, FOB) and dairy cattle could be considered in further analysis. In future work, other trends and dynamics to pricing strategies could be explored as well.

As lower quality grade animals have become less numerous in the national herd, the relevance of considering impacts to price and pricing methods perhaps is declining. With more homogenous herd transaction type differences, pricing strategies become more difficult to discern. Based on this analysis, there is no difference in transaction types or pricing strategies based on expected grading quality differences.

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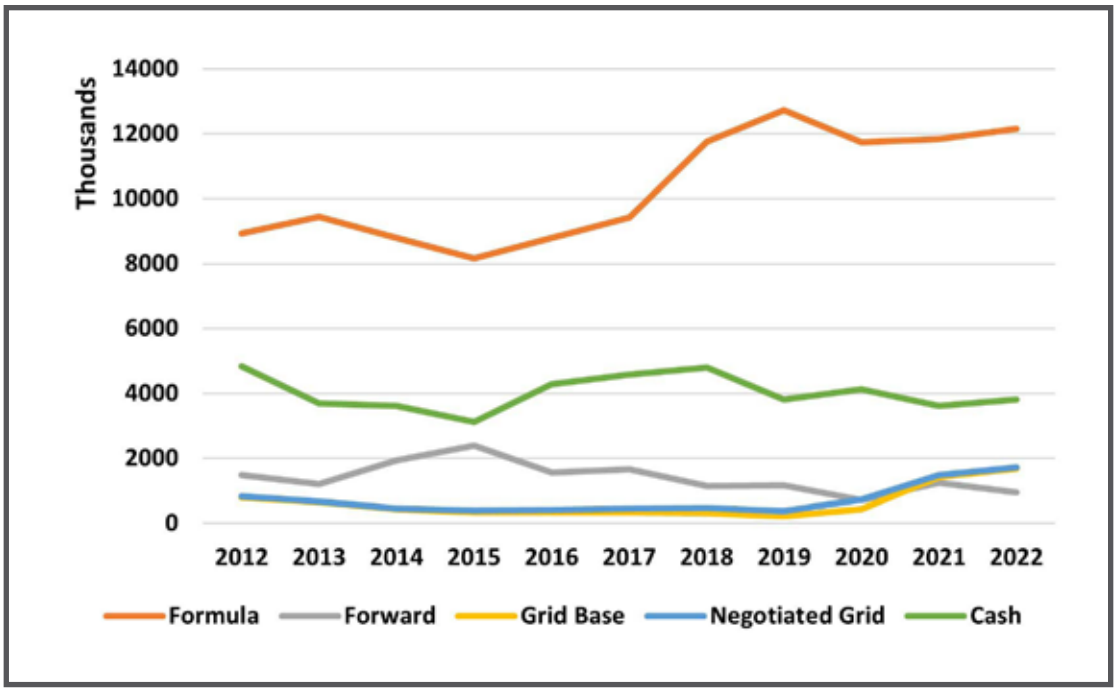

Figure 1. Annual total head marketed by transaction type

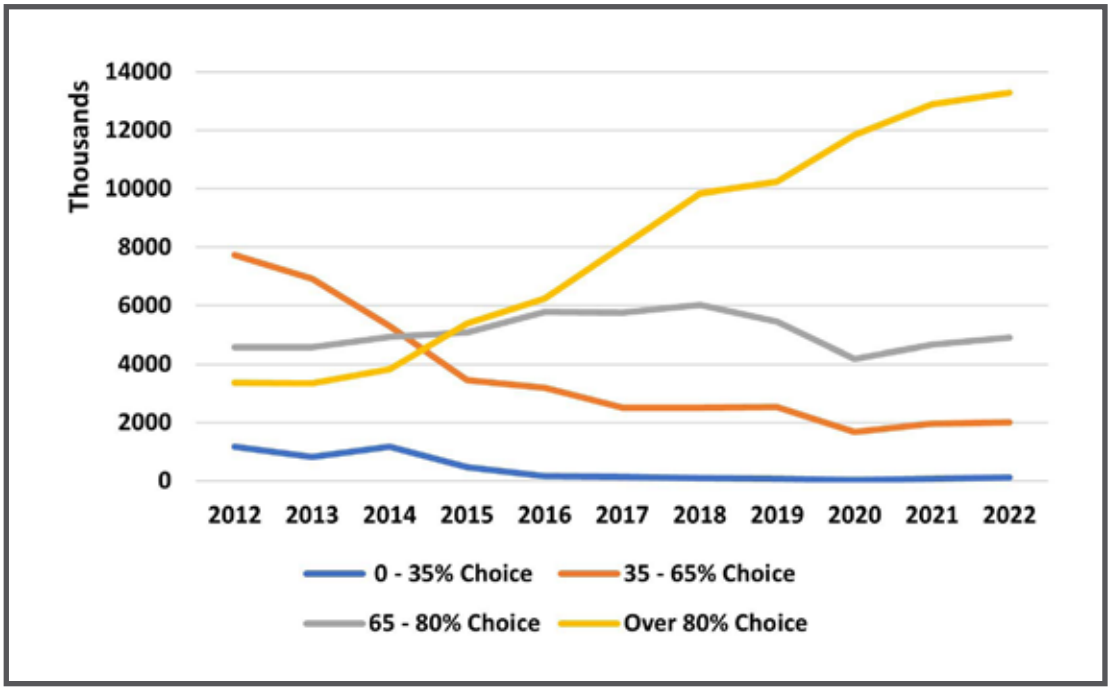

Figure 2. Number of animals by grading distribution over time

Table 1. Percent of Head Marketed by Transaction Type for Each Region (2012-2022).						
	Cash	Formula	Forward	Grid Base	Negotiated Grid	Total
CO	8%	78%	12%	0%	2%	8%
IA-MN	55%	24%	12%	2%	7%	11%
KS	19%	68%	6%	4%	4%	27%
NE	37%	43%	11%	5%	4%	27%
TX-OK-NM	7%	80%	5%	4%	4%	27%
Total	24%	60%	8%	4%	4%	100%

Table 2. Distribution of Transaction Type by Grade						
	Cash	Formula	Forward	Grid Base	Negotiated Grid	Total
0 - 35% Choice	2%	75%	10%	3%	10%	2%
35 - 65% Choice	16%	69%	8%	4%	3%	21%
65 - 80% Choice	27%	59%	8%	3%	3%	30%
Over 80% Choice	26%	57%	8%	4%	5%	47%

Table 3. Regional Breakdown of Transaction Type for Cattle Expected to Grade 0-65% Choice						
	Cash	Formula	Forward	Grid Base	Negotiated Grid	Total
CO	1%	6%	1%	0%	0%	7%
IA-MN	0%	1%	0%	0%	0%	2%
KS	7%	14%	2%	0%	1%	24%
NE	3%	7%	2%	1%	1%	13%
TX-OK-NM	4%	42%	3%	3%	2%	54%
Total	15%	69%	8%	4%	4%	100%