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SOURCES OF VARIABILITY IN FED-CATTLE GRID PRICING

J. L. Graff¹ and T. C. Schroeder¹

Summary

Price variability among carcasses increases with a change from live-weight to dressed-weight to grid pricing. Grid pricing has the largest price variability, because the price for each carcass is influenced by all of the components of the grid, rather than all cattle selling for the same live or dressed price. Therefore, producers selling on a grid need to have knowledge about the expected carcass merit of their cattle. We used data on 11,703 head of cattle to determine which grid pricing components influence price variability the most and to measure how much price variability increases from grid pricing, relative to live and dressed pricing, at the individual-carcass and individual pen levels. The Choice-to-Select price spread has the largest influence on price variability per hundredweight, and average carcass weight had the largest influence on price variability per head. Whether price variability increased for both individual-head and individual-pen levels depended on the quality of the cattle sold and the grid on which they are sold. To manage the increased price risk created by pricing, producers must first manage that risk on an individual-head level through genetics, management, and sorting methods. The more knowledge producers have about the expected merit of their cattle, the more profit can be enhanced through grid pricing.

(Key Words: Grid Pricing, Value-Based Pricing, Price Variability.)

Introduction

Consumer demand for leaner, more consistent, higher quality beef has motivated the beef industry to move toward a more value-based pricing system. To improve price signals to producers, packers have developed grid-pricing systems that value each carcass based on its own merit, as opposed to one price for an entire pen of cattle weight. By using grid-pricing systems, producers who market high quality cattle are rewarded with premiums, whereas producers who market low quality cattle receive sizeable discounts, relative to average market prices.

Previous studies have confirmed that on an individual basis, variability in price increases with a change from live weight to dressed weight to grid pricing. As price variability increases across these methods, price risk faced by the producer also increases. Therefore, producers must determine before the cattle are slaughtered whether those carcass have characteristics that will be rewarded by selling on a grid. If cattle sold on the grid do not fit specifications, they may be discounted severely and receive a price lower than if they were sold on a live-weight basis. The purposes of this study were to assist producers in determining which quality characteristics affect price variability the most and to determine if price variability from grid pricing increases relative to live and dressed pricing.

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Experimental Procedures

To determine what grid factors most affect price variability and to compare price variability on individual-head and individual-pen levels, data on 11,703 head of cattle (71 pens) marketed from January 1997 to December 1997 were collected from a large cattle feeding operation. Data consisted of cattle sold using a grid and included the quality grades, yield grades, carcass weights, and prices received for each carcass. Also, the dressing percentages, total live weights of the pens and the dates they were delivered to the packer were included. The cattle graded Choice (63.5%) and Select (27.5%), standard/no roll (7.5%), Prime (1.5%), and .2% heiferettes. Approximately 43% were yield grade 3, 33% were yield grade 2, and 6% were yield grade 4 or 5. The dressing percentage ranged from 61.8% to 65.3% and averaged 63.6%. The average carcass weight was 798 lbs.

To determine which components of grid pricing had the largest effect on price variability, the standard deviation of price/cwt among carcasses within a pen was regressed on grid-pricing components. These components included the percentage of carcasses from a pen that weighed less than 525 lbs, the percentage of carcasses weighing more than 950 lbs, the standard deviation of the average live weight of the cattle in a pen, the standard deviation of the quality and yield grade in a pen, and the Choice-to-Select price spread. To compare pricing methods and determine if price variability increased when cattle were sold using a grid, the same cattle were priced on live- and dressed-weight methods and on an actual Midwestern packer grid. The variability in price/cwt received in each of these pricing methods was compared.

Weekly live and dressed, fed cattle prices were determined based on the percentage of Choice cattle in the pen and were collected from the United States Department of Agri-

culture (USDA). The Choice-to-Select price spread collected from weekly boxed beef prices from the USDA averaged \$6.62/cwt, with a standard deviation of \$1.90/cwt.

Results and Discussion

The grid pricing component that had the largest effect on price variability was the Choice-to-Select price spread (Table 1). However, on a revenue-per-head basis, the average carcass weight had the largest influence on variability.

As the Choice-to-Select price spread increased by 1%, the standard deviation of price increased by 0.77% (Table 1). Similarly, as the standard deviation of live or carcass weight increased by 1%, the standard deviation of revenue per head increased by 0.77%.

Price variability increased when moving from live-weight to dressed-weight to grid pricing when cattle were priced individually (Table 2). The grid pricing method had the highest standard deviation and was always statistically different ($P < .05$). Typically, grid price variability was more than double that of the other methods with individual carcass pricing.

To help manage risk, producers have several options. They can breed for superior genetics so the cattle better match the grid specifications and receive premiums for high quality. They can feed cattle to desired market weights to avoid large weight discounts. They also can sort cattle according to grid specifications. Initially accounting for variability at the individual-head level may help to increase revenue at the individual-pen level, which is where many producers measure improvement. In general, the more knowledge producers have about the expected merit of their cattle and how these carcass qualities affect price variation, the better price risk can be managed.

Table 1. Percentage Change in Standard Deviation of Price and Revenue with One Percent Changes in Selected Variables

Independent Variable	Dependent Variable: Standard Deviation of	
	Price, \$/cwt.	Revenue, \$/head
% Lightweight carcasses	0.084	0.039
% Heavyweight carcasses	0.136	-0.175
Weight standard dev.	0.052	0.771
Quality grade standard dev.	0.463	0.097
Yield grade standard dev.	0.205	0.071
Choice-to-Select price spread	0.773	0.234

Table 2. Summary Statistics of Pricing Methods for 11,703 Individual Cattle or Carcasses

Pricing Method	Mean	Standard Dev.	Minimum	Maximum
-----\$/cwt (live basis)-----				
Live-weight	65.60	1.78 ^a	61.89	69.96
Dressed-weight	67.19	1.90 ^a	63.07	71.22
Grid	66.90	3.91 ^b	44.46	80.69
-----\$/head-----				
Live-weight	823.00	82.38 ^a	478.73	1,200.33
Dressed-weight	842.60	84.92 ^b	486.19	1,247.19
Grid	839.07	91.60 ^c	357.49	1,251.85

^{a,b,c} If superscripts are the same, numbers are not statistically different (P<.05).