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INTRODUCTION

Over the last couple of years there has been a much greater emphasis on improving the quality and consistency of beef. Cattle producers, breed associations, feed suppliers, and beef packers have all initiated new value based pricing methods. Grid pricing, formula pricing, and strategic alliances are examples of these new value based pricing methods. While these pricing methods may differ substantially in the carcass and management traits they seek to reward or penalize, they all have one common feature: price is established on each individual animal.

The goals of these new pricing methods are to price cattle based on their "true" value to consumers, to reduce problems of inconsistency in the final product, and to send appropriate market signals to producers. Pricing accuracy improves as pricing moves from a showlist to a specific pen to an individual head basis. However, price variation also increases when pricing on an individual head basis. Cattle are not created equal, or at least do not produce equal carcasses. They have a different value.

What is the true value of a carcass? Do consumers only want upper choice product? Do all consumers want lean beef! There are different markets for beef and each market places a higher or lower value on certain traits. Some of the grids, formulas and alliances seek to target different consumer markets by placing greater premiums on selected traits and greater discounts on others. The true value of a specific animal is therefore dependent upon the target market. To achieve the greatest economic return, it is necessary to match cattle to the market for which they are most suited.

The objective of this paper is to outline some of the issues and problems associated with matching cattle to the appropriate market. The following questions will be addressed: How to choose the “best” grid? How important is the base price to a grid? Is maximizing the sale price equivalent to maximizing revenue or profit? What are some of the industry concerns with grid and formula pricing?

GRID PREMIUMS/DISCOUNTS AND BASE PRICES

One of the first steps that should be taken in selecting a pricing grid is to evaluate the premiums and discounts applied to various traits. If you are producing lean cattle, then a grid with significant premiums paid for yield grade 1 and 2 carcasses will most likely be advantageous. However, if most of your cattle have a yield grade of 3 and you typically have several yield grade 4 carcasses in a pen, then a grid with high premiums on yield grade 1 and 2 carcasses may not be as advantageous as a grid with no discounts on yield grade 3 carcasses and only modest yield

grade 4 discounts. Similarly, quality grade premiums and discounts may be very important for some pens of cattle and during certain times of the year.

Over time, the premiums for yield grade 1 and 2 carcasses, the upper choice and prime premium over choice, the standard discount compared to select carcasses, and the discounts for light or heavy carcasses have remained quite stable or fixed on many grids. However, the choice-select spread and the yield grade 4 discount are more variable with many grids and are dependent upon market conditions.

Choosing the "best" grid for a pen of cattle is more difficult then simply comparing the premiums and discounts of alternative grids with the expected cattle traits. An extremely important consideration is the base price of the grid. Two grids may have very similar premiums and discounts, but the base prices may be calculated or obtained in very different ways. Different base prices have a large impact on the final net price received.

Base Price Considerations

There are several issues that need to be considered when evaluating alternative base prices. Is the base price a market reported cash price or is it a formulated price based on plant averages? How local or regional is the cash price for the base and at what level is the base determined e.g. live weight, dressed weight, box beef? The answer to these questions have important implications to the value of specific pens of cattle, to the efficiency of the market in general, and to the potential for market power and price manipulation.

Base prices for grids in the Texas-Oklahoma panhandle, Kansas, and Colorado are often established using the reported live prices for those regions. In Nebraska the base price is generally established using the reported dressed price for Nebraska. Other grids may tie the base price to the Live Cattle Futures price. Some grids may simply use the relevant cash price series to establish the base price for a USDA choice, yield grade 3 carcass, for example.

However, it is more often the case that the cash price is just a part of a formula to determine the base price. Many base prices are adjusted on a plant-by-plant basis, in response to the type of cattle being slaughtered at that plant. Plant average dressing percentages are used to adjust live base prices to carcass equivalent prices. Generally speaking, if your cattle have a higher dressing percentage than the plant average, then you will receive a price premium. Base prices are frequently adjusted for the percentage of cattle grading choice or higher at the plant. Yield grades may also be used in arriving at the base price for the plant. Data from the plants prior weekly kill or the average of the three to four weeks prior kill is used to establish base-lines for yield. quality grade and other specifications.

A simplified example of how differences in plant averages impact base prices and producers net prices for their cattle is displayed in Table 1. There are two plants that have the same premiums and discounts associated with quality grades and both plants are using the same cash price for a reference. However, the percentage of cattle in each grade differs at the two plants. The base price is arrived at by (l) multiplying the premium or discount by the percentage of cattle in that category, (2) summing these premiums and discounts, and (3) subtracting this sum from the cash market price. The net price for a pen of cattle sold at either plant is arrived at by (1) multiplying the premium or discount by the percentage of the pen in that category, (2) summing these premiums and discounts, and (3) adding this sum to the base price of the plant. (This is the exact formula for one specific alliance. Other grids have different methods of arriving at the base price, but plant differences are just as important.)

In the example in Table 1, the net price for the pen varies by $2.95 per hundred of carcass weight depending upon the plant base. With Plant A the price from the formula, $108.76, is less than the average cash price of $110 per cwt. However, the net price at Plant B is above the average cash price.

A disadvantage of base prices tied to plant averages is that the "true value" of a pen of cattle is now relative to the plant average and not an absolute based on the quality of the pen. In addition, from a market efficiency point of view, there are different market signals being sent to producers, for producing a similar product. This creates an inefficiency in the market place, and will impede the efforts of the beef industry to improve the quality and consistency of their product.

Table 1. Example of Plant Averages Impacting Base Prices and Net Producer Prices.

Quality Grade	Formula Pre/Dis	Plant A Averages		Plant B Averages		Sample pen of cattle	
		Percent	Pre/Dis	Percent	Pre/Dis	Percent	Pre/Dis
Prime	$6	5%	$0.30			2%	$.12
CAB	$3	15%	$0.45	10%	$0.30	13%	$.39
Choice		55%		45%		50%	
Select	-$10	25%	-$2.50	40%	-$4.00	35%	-$3.50
Standard	-$20	0%		5%	-$1.00		

Base Price = Market Price - Plant Net Premium or Discount

Plant A $111.75 = $110.00 - (-$1.75)

Plant B $114.70 = $110.00 - (-$4.70)

Pen Net = Plant Base Price + Pen Net Premium or Discount

Plant A $108.76 = $111.75 + (-$2.99)

Plant B $111.71 = $114.70 + (-$2.99)

Should base prices be established off from any fed cattle price series, or should the base price be established off from a boxed beef or wholesale beef price? There are three issues that should be considered in responding to this question: 1) market power and captive supplies, 2) thin cash markets, and 3) market efficiency. Many individuals are concerned that pricing more cattle on a grid or formula will give packers greater control of the market and that packers will decrease bids in the cash market. This will result in lower prices for both cash sale cattle and grid or formula sale cattle, since base prices are tied to cash prices. Additionally, if more cattle are sold on a grid, and presumably these would be average or above average cattle, then the cash markets may become thin and not representative of the cattle population in general. This would also tend to decrease the cash market price and hence the grid cattle price. As seen in the pricing example above, the current grids and formulas tied to plant averages may still be distorting consumer signals and not sending clear market signals back to producers.

Are there remedies to the above concerns? One possibility is to move the base price for grids to a box beef or wholesale adjusted beef price. This would address all of the above concerns. Packers are always negotiating for higher box beef prices, so this would greatly reduce the concerns of market power and price manipulation of the packers in the fed cattle market. Grid prices would be reflective of what the packers are selling beef for. The thinness of cash fed cattle markets would not effect grid prices, but would still be a concern to those not selling on grid. From a market efficiency standpoint, moving the base price closer to the consumer, would likely result in consumer signals being passed more directly to producers.

There are some concerns with establishing base prices off from box beef or wholesale prices. This market price is not well reported nor is it understood by many producers. It may also be more difficult to establish a base price from one of these series and properly account for drop credits, by-product values, and different qualities and cuts of beef. Since packers sometimes make a healthy profit on cattle and sometimes "lose their shirt" on cattle, there will be times when this base price is much above the cash price and sometimes when it is much below the cash price. For large feedlots that sell cattle on a regular basis, these price swings should average out. However, for an individual producer who has retained ownership and sells one time on the market, these swings in beef prices may present more risk than the current cash cattle market does.

The preceding discussion has raised several issues regarding the importance of base prices. Many of these issues do not have easy solutions, but need to be considered by the beef industry. At a minimum. producers need to be aware of how the base price is determined for the grid on which they intend to sell.

MATCHING CATTLE TO A GRID

Once the premiums and discounts are known and the base price is known for a grid or formula, the next set of questions to answer is: Do your cattle naturally fit the grid? Can they be fed to fit the grid? Can they be sorted to fit the grid?

Cattle have a natural end point to which it is most economical to feed them. This end

point will vary by frame size, breed, genetics within a breed, and market prices. For example, one pen of cattle may finish with an average 850 pound, select, yield grade 2 carcass and another pen may finish with an average 700 pound, upper choice, yield grade 3B carcass. With the first pen, a grid that pays a premium on yield grades 1 and 2, has no or very little discount on select carcasses, and does not penalize heavy weight carcasses will be most advantageous. For the second pen, a grid that pays a large premium for upper 2/3 choice and prime, does not discount yield grade 3B carcasses and has a relative small discount on yield grade 4 carcasses will be most advantageous. However, as noted in the previous section, the base price calculations for each grid could alter how profitable it is to sell on that grid.

If cattle are not naturally lean, can they be fed and managed to fit a grid that rewards leanness? If cattle do not naturally grade choice or higher, can they be fed and managed to fit a grid that rewards high marbling cattle?

Maximizing Price vs. Revenue vs. Profit

In answering the two previous questions, it is necessary to distinguish between maximizing the price received, the revenue received, and the profit earned for a pen of cattle. Receiving the highest price doesn't imply the greatest revenue nor does the greatest revenue imply the largest profit. Revenue is equal to price multiplied by weight, and profit is equal to revenue minus feeding and initial costs. To maximize profit on a pen of cattle, selling weight and feeding costs need to be considered, in addition to selling price.

Consider a pen of cattle that if fed for the normal number of days on feed would finish with the majority of the carcasses being yield grade 3 and about 60 to 65 percent choice or higher. If these cattle were fed for fewer days and marketed on a grid that rewards yield grade 1 and 2 carcasses, what would be the likely result? There would most likely be more yield grade 1 and 2 carcasses, the cattle should still grade 55 to 60 percent choice, and it is likely that the net grid price would be higher than the cash market price. The grid worked: the cattle were sold at a higher price. But what about revenue and profit? Feeding for fewer days would result in selling lighter weight carcasses. Revenue is equal to price multiplied by weight. Two weeks fewer days on feed would probably reduce carcass weight by 25 to 35 pounds. If the carcass price is $100 per hundred weight, that is a reduction in revenue of $25 to $35 per head. If the net grid price was $1 to $2 per hundred weight higher than the cash price, and the average carcass weight was 750 pounds, that is an increase in revenue of $7.50 to $15 per head. Revenue could have decreased by $10 to $27.50 per head. Depending upon feed prices and consumption, feeding costs would likely decline by $20 to $30 per head. Therefore, profit could have been reduced by as much as $7.50 per or increased as much as $20 per head in this example. The point of this example is that producers need to consider more than price when changing the feeding program to fit a grid. It should be noted, the higher the general carcass price, the more critical the carcass weight becomes.

A similar analysis needs to be done if a producer is considering feeding cattle longer than normal to improve quality grade for a grid. Normally, the quality grade may not increase that much, there will be a larger number of yield grade 4 carcasses and fewer yield grade 1 and 2

carcass, there may be some heavy weight carcass, and feeding costs will definitely increase. All of these factors need to be considered to determine if profit has increased or decreased.

Sorting

Can or should pens of cattle be sorted to fit different grids or sorted to sell some cattle on the cash market? Sorting cattle to fit different grids may be economical provided a producer has a good idea how the different sorts of cattle will look with the hide off. Sorting out junk cattle and mixing them with a pen that is sold on the cash market for the average market price is a short-sighted approach to marketing. Profits will be increased with that sort, but if the practice continues, the average cash market price is likely to decline. Additionally, it will delay the time for the industry to eliminate or reduce poor quality cattle and may lead to further losses in beef market share and lower fed cattle prices.

Sorting pens to fit grids or simply choosing the "best" grid or cash marketing method to sell a pen of cattle on is more difficult then might be expected. To demonstrate the difficulty in choosing the "best" pricing method, ten pens of predominantly black-hided, calf- fed steers were evaluated. There was only 100 pounds difference in the average live weight of the ten pens, and they were all fed at the same feedlot. They appeared to be fairly uniform cattle. However, there were some very important differences in dressing percentage and in the percentage of the cattle grading choice (Table 2).

Sales were simulated on a live weight, dressed weight, and two grid pricing methods. Two marketing time frames were considered and two different packer grids were used. The USDA 5- state weighted average cash price for live steers was $67.77 and 68.94/cwt. and for dressed steers it was $111.48 and $111.09/cwt. for the two marketing periods. The choice-select spread was over $15/cwt. in the first period and was about $6/cwt. in the second period. Discounts for yield grade 4 carcasses also varied by period. The premiums and discounts for the two different packer grids changed to reflect the different choice-select spreads and different yield grade 3 discounts (Table 3).

The results of the simulated sales across the alternative pricing methods and time periods are displayed in Table 4. On average, if all the pens were sold via one pricing method, then selling on the grid was most profitable in the first time period and selling live was most profitable in the second time period. The most profitable grid switched between the two time periods. The most profitable method of pricing the individual pens switched for four of the ten pens between time periods.

These pens are not representative of the cattle on feed population. Therefore, it is not correct to generalize which pricing method would be "best" on average for the feeding industry. However, the ten pens did appear uniform and do show the difficulty in trying to choose the "best" pricing method.

Table 2. Summary Characteristics of the Ten Pens of Black-Hided Calf-Fed Steers.

	Average	Maximum	Minimum
Live Weight	1115	1147	1048
Carcass Weight	694	721	661
Dressing Percentage	62.2	64.0	59.6
Percentage Choice	61.7	77.1	44.1
Yield Grade	3.0	3.4	2.8

Table 3. Grid Prices (Carcass $/cwt) for the Two Grids and Two Time Periods.

	Grid A		Grid B	
	Period 1	Period 2	Period 1	Period 2
Base Price	118.50	114.00	112.20	112.20
Prime	7.00	7.00	11.51	6.51
CAB	3.50	2.50	8.51	3.51
Choice	0.00	0.00	7.51	2.51
Select	-20.50	-7.00	-9.09	-3.59
Standard	-40.50	-27.00	-19.09	-13.59
Yield Grade 1	2.00	2.00	3.00	3.00
Yield Grade 2	2.00	2.00	1.50	1.50
Yield Grade 3	0.00	0.00	-1.00	-1.00
Yield Grade 4	-10.00	-8.00	-20.00	-15.00
Yield Grade 5	-10.00	-13.00	-25.00	-20.00
Light Weight	-10.00	-10.00	-20.00	-20.00
Heavy Weight	-15.00	-15.00	-20.00	-20.00
Outs	-50.00	-40.00	-20.00	-20.00

Table 4. Average Revenue Per Head From Selling All 10 Pens via Each Pricing Method and The Number of Pens for Which Each Pricing Method is the Most Profitable.

	Period 1		Period 2	
Pricing Method	Average Revenue	# of Pens Most Profitable	Average Revenue	# of Pens Most Profitable
Grid A	764.59	1	765.26	2
Grid B	771.09	3	762.87	1
Dressed	764.30	4	761.59	3
Live	755.38	2	768.42	4

SUMMARY AND IMPLICATIONS FOR THE BEEF INDUSTRY

Pricing fed cattle is becoming more complex, as there are more available alternatives. There is not one "best" pricing method for all cattle all of the time. In fact, the most profitable pricing method will depend upon cattle type, market prices, grid premiums and discounts, and base prices for the grids. It may be difficult to know based solely on visual appraisal which pricing method to use.

There will be winners and losers from the new marketing environment. A producer who has cattle that are better than average, particularly better than the plant average for a grid, and that fit a specific grid, may see net returns increase by $25 to $50 per head. Likewise, producers of poorer quality cattle -- cattle that don't grade well, have a lower dressing percentage, have more dark cutters, hard bones, etc. -- will likely see returns decrease by over $50 per head.

Implications

If a significant number of producers begin sorting their cattle and selling the higher quality cattle on a grid or formula and continue to sell the rest of the cattle on the live weight market or in-the-beef, then what are the implications for the quality and hence the price in the live or in-the-beef market? If packers identify that there is a quality difference between formula priced cattle and live weight priced cattle, then they will obviously try and purchase the live weight cattle for a lower average price. However, if the grids and formulas base prices remained tied to the live or in-the-beef cash price, then the net price on the grid or formula will also decline. To be a "truly" value-based pricing system. the premiums would have to increase if the base price declined for sellers to remain equally rewarded for producing a superior product.

An alternative solution to the above dilemma is to free the base price from the cash fed cattle market and to tie it to a box beef price or a weighted average wholesale beef price or index. From a market efficiency perspective, if an appropriate box beef or wholesale beef price could be used, then the price of fed cattle sold on a grid or formula would be tied more closely to the final consumer market. However, this base would not reflect changes in the hide and offal market that a packer bid may reflect.

Another alternative is to have grid and formula prices reported in the market place. If either packers or feeders reported the net price received from selling on a grid or formula, then these prices could be averaged in with the reported cash sales. In this manner, market prices should be reflective of all cattle being sold. This should reduce concerns that the cash market will become thinner and may represent a different quality market.

In conclusion, as pricing moves away from pricing all cattle on a showlist at one price, to pricing each individual pen, to pricing each individual animal on a grid or formula, pricing accuracy should improve. Consumer signals for various product traits should reach producers in a more direct manner. Overall efficiency in the beef industry should improve if cattle are fed and targeted for the market to which they have the most natural fit.