Fed Cattle Pricing: Formulas and Grids

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The formation of marketing agreements between large cattle feeders and the largest meatpacker in the late 1980s created considerable interest in formula pricing fed cattle. Since then, the term grid pricing has come into vogue. In this Extension Facts, we discuss formula or grid pricing, give examples, and mention some of the issues surrounding formula pricing.

Formula/Grid Pricing

Formula pricing need not be grid based, but grid pricing is usually a formula. Packers claim to have used price grids for years, and to a limited extent they are correct. However, in the examples presented later, some differences will be noted between what packers used for years and what they are using today. Most marketing agreements and strategic alliances use some type of formula or grid pricing method.

With most formulas and grids, price is discovered after animals have been slaughtered. There may be a few exceptions, but most formulas and grids are based on dressed weights for fed cattle. Unlike live weight pricing or dressed weight "in the beef" pricing where there is a single average price for the entire sale lot (see Extension Facts WF-556, *Fed Cattle Pricing: Live Weight and Dressed Weight*), a price may be discovered for each animal with formula or grid pricing. As a result, higher quality cattle receive higher prices and lower quality cattle receive lower prices, thereby improving pricing accuracy and rewarding cattlemen who market desirable types of cattle.

Most formulas and grids consist of a base price with specified premiums and discounts for carcasses above and below the base or standard quality specifications. Interviews with feeders and packers revealed several base prices (Schroeder et al. 1997):
- Average price (cost) of cattle purchased by the plant where the fed cattle were scheduled to be slaughtered for the week prior to or the week of slaughter.
- Specific market reports, such as highest reported price for a specific geographic market for the week prior to or week of slaughter.
- Reported price for the live cattle futures market price.
- Boxed beef cutout value.

- Futures market price.
- A negotiated price.

Both feeders and packers indicated that premiums and discounts stated in grids or formulas also varied. Some were based on plant averages, while others were negotiated. Some premiums or discounts have been found to be very stable over time for a single packer's price grid, while others, such as the Choice-Select price difference, change with changing wholesale market conditions.

Grid Pricing Example

Individual packers develop their own grids. The format in which they are presented may vary, but Table 1 contains an example grid. It does *not* represent the grid for any specific packer. The premiums and discounts in Table 1 can be put into a matrix format. The term grid comes from the matrix framework of premiums and discounts for specified carcass characteristics. Quality grade and yield grade premiums and discounts compared with the base price are shown in the Choice row and Yield Grade 3 column of Table 2. To complete the matrix in Table 2, we assume quality grade and yield grade premiums and discounts are additive. For example, the premium for a Prime grade, yield grade 1 carcass in Table 2 is $11/cwt. That amount is the sum of the $6/cwt. premium for

Table 1. Example Grid, as Presented by a Packer ($/dressed cwt.)

Choice YG3 6/900#	Base Price
Prime-Choice Price Spread	+6.00
Choice-Select Price Spread	-6.00
Select-Standard Price Spread	-10.00
Dark cutters	-20.00
Light Carcasses (<600 lbs.)	-10.00
Heavy Carcasses (>900 lbs.)	-20.00
YG1	+5.00
YG2	+3.00
YG4	-20.00
YG5	-25.00

Table 2. Example Grid in a Completed Matrix Format ($/ dressed cwt.)

| | Yield Grade | | | | |
	1	2	3	4	5
Quality Grade					
Prime	+11	+9	+6	-14	-19
Choice	+5	+3	Base	-20	-25
Select	-1	-3	-6	-26	-31
Standard	-11	-13	-16	-36	-41
Dark cutters -20					
Light carcasses (<600 lbs.) -10					
Heavy carcasses (>900 lbs.) -20					

Prime grade carcasses plus the $5/cwt. premium for yield grade 1 carcasses.

For years, head buyers at meatpacking firms have developed a daily buy order which is given to their field buyers to implement. Their order resembles the sample grid in Table 1. Most packers paid only small premiums for higher quality cattle and larger discounts for lower quality cattle. Grids or formulas used in recent years differ from previous years in that premiums for higher quality cattle are frequently larger than before. Discounts for lower quality cattle may still be larger than premiums for higher quality cattle, but packers presumably send clearer signals with the grids being used today than in previous years. Packers want higher quality cattle because lower quality cattle have a considerably lower wholesale value and are much more difficult to market profitably. Thus, discounts for lower quality cattle are and should be large.

Packer grids may identify additional premiums for carcasses meeting specifications of Certified Angus Beef (CAB) or other marketing programs. Likewise, packers may specify discounts for hide damage, injection site blemishes, condemnations and other "out" or unmarketable carcasses (in addition to discounts for dark cutters and light or heavy carcasses as shown in the sample grid).

To compute a grid-based formula price, the distribution of carcasses by quality grades and yield grades from a sale lot of fed cattle must be known. That distribution also is put into a matrix framework. The hypothetical distribution of carcasses for a 100-head sale lot of steers is shown in Table 4. Our hypothetical pen is a mix of exceptionally high quality carcasses (80 percent Choice and Prime quality grade) and lower quality carcasses (20 percent yield grades 4 and 5).

Table 3. Example Distribution of Carcasses by Quality and Yield Grades (100 Head Total)

Yield Grade	1	2	3	4	5	Sum
Quality Grade						
Prime	1	2	3	4	5	15
Choice	3	15	40	5	2	65
Select	4	3	2	1	1	11
Standard	3	2	2	1	1	9
Sum	11	22	47	11	9	100

Table 4. Plant Average Grid Price Example ($/dressed cwt.)

	Plant A	Plant B
Dressed weight cash price	$110.00	$110.00
Choice-Select price spread	6.00	6.00
Plant average percent Choice	60 %	40 %
Plant average percent Select	40 %	60 %
STEP 1: Compute the Choice-Select Price Spread Effect (Choice-Select price spread x plant average percent Select)	$2.40	$3.60
STEP 2: Add the Choice-Select Price-Spread Effect (Dressed weight cash price + Choice-Select price spread effect) Base Price	$112.40/cwt.	$113.60/cwt.

Step 1: Compute the effect from having less than 100 percent Choice carcasses. The Choice-Select price spread effect is greater for Plant B than Plant A because the quality of carcasses on average were lower for Plant B.

Step 2: Adjust the dressed weight cash price by the Choice-Select price spread effect. The end result is the computed plant average base price. Other adjustments may be made, such as for Prime or CAB carcasses, yield grade 1-2 or 4-5 carcasses, heavier or lighter carcasses, etc.

The formula or grid price can be computed in one of two ways, both resulting in the same weighted average price for the sale lot, *assuming quality grade and yield grade premiums and discounts are additive in Table 2.* For the example here, a base price of $110/dressed weight is assumed and the weighted average price is $105.56/cwt.

- **Method I:** Base Price + the sum of premiums and discounts. Premiums and discounts are calculated by multiplying the percent of carcasses in each matrix cell in Table 3 times each premium and discount cell in Table 2.
- **Method II:** Base Price + the sum of premiums and discounts. Premiums and discounts are calculated by multiplying the percent of carcasses in each row and column total in Table 3 times the respective premium or discount in the Choice quality grade row and yield grade 3 column.

In essence, the difference between the two methods is that Method I requires the percentages of carcasses in each matrix cell, whereas Method II uses only row and column totals in Table 3. For our example, we assumed there were no "out" carcasses. The actual net price for a pen of cattle may vary somewhat from the calculated price because of differences in carcass weights for animals in each matrix cell.

Plant Average Grid Price Example

The base price assumed in the above example was a dressed weight price. Essentially, it is a boxed beef price per head plus by-products value and less slaughtering-fabricating costs (see Extension Facts WF-556, *Fed Cattle Pricing: Live Weight and Dressed Weight*). However, in several formulas, the base price is a plant average price.

Assume we have two packing plants, each using a plant average base price in their formula price bids. Both may use the same beginning dressed weight cash price and the same Choice-Select price spread (Table 4). Assume the plant average base price is calculated on the basis of last week's slaughter results. Carcasses in Plant A last week averaged 60 percent Choice grade, which was better than carcasses in Plant B which averaged 40 percent Choice.

Note that in this example, the plant that had the lower quality cattle the preceding week pays the highest base price. The higher base price is an incentive to ship higher quality cattle to Plant B, in order to bring its plant average up to or above its competitor's plant. If cattle feeders know how their cattle will grade on average and they know the plant averages, they can choose which plant will pay the highest base price. It is to their advantage to market cattle which will be better than the plant average to the plant that has the lowest plant average for the base price week, and thus can pay the highest plant average base price.

Formula and Grid Pricing Considerations and Issues

Perhaps the two *primary* implications of marketing fed cattle with formula or grid pricing are:
- Cattle feeders *MUST* know their cattle quality; and
- Cattle feeders *MUST* know how the formula or grid price is calculated.

Many producers do not know how their cattle perform in carcass form. Without knowing the carcass quality of their cattle, marketing on the basis of a formula or grids may be disappointing. Formulas and grids can provide an incentive to market higher quality cattle. However, the penalty for not recognizing and marketing lower quality cattle is large. Even a few lower quality cattle, priced at large discounts to higher quality cattle, can offset the premiums for higher quality cattle. The bottom line results might be a price that is lower on average than a live-weight or dressed-weight cash price.

For example, in Table 3, there are 21 head of Prime and Choice, YG1-2 carcasses. Together, using the grid in Table 2, they add a premium of $1.39/cwt. to the base price. Also in Table 3 there are just four Select and Standard YG4-5 carcasses. Together their discounts reduce the base price by $1.34/cwt. Discounts from four lower quality carcasses nearly offset completely the premiums from 21 higher quality carcasses. Cattle quality significantly affects the bottom-line price results when marketing by a formula or grid method.

A higher base price is probably more critical to receiving a higher net price from a grid-type formula than are the specific premiums and discounts. The base price affects all cattle in the sale lot, whereas premiums and discounts affect only selected carcasses.

Since base prices often vary and both premiums and discounts vary from one packer to another, producers *must*

understand the formula or grid and how price is computed. Is cattle quality being paid on an absolute or relative basis? Under plant average grid pricing, cattle quality is being paid on the basis of your cattle quality relative to other cattle slaughtered previously in the same plant. With the first grid pricing example above, cattle quality is being priced on its own merit, not relative to other cattle.

Cattle producers need to ask other questions. Do my 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, economical end feeding weight. This end weight or point varies by frame size, breed, genetics within a breed, and market prices for inputs and fed cattle. For example, one pen of cattle may produce carcasses averaging 850 pounds of dressed weight, which grade mostly Select yield grade 2. Another pen may produce carcasses averaging 700 pounds of dressed weight, and grade mostly upper Choice yield grade 3. With the first pen, a grid that pays a premium on yield grades 1 and 2, minimally discounts Select carcasses, and does not penalize heavy weight carcasses will likely be advantageous. For the second pen, a grid that pays a large premium for upper 2/3 Choice and Prime, does not discount yield grade 3 carcasses, and has only a small discount on yield grade 4 carcasses will likely be advantageous.

Receiving the highest *price* doesn't imply the greatest *revenue*, nor does the greatest revenue imply the largest *profit*. Revenue is price multiplied by weight, and profit is revenue minus costs. To maximize profit on a pen of cattle, the selling weight and feeding costs need to be considered, in addition to the 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 60-65 percent Choice grade or higher. If these cattle were fed fewer days and marketed on a grid that rewards yield grade 1-2 carcasses, what would be the likely result? There would most likely be more yield grade 1-2 carcasses, 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 fewer days would result in selling lighter weight carcasses. Revenue is equal to price multiplied by weight. A two-week shorter feeding period 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 $1-2/cwt. higher than the cash price, and the average carcass weight was 750 pounds, that is an increase in revenue of $7.50-15/head compared with a cash market price. Thus, net revenue could have decreased by $10-$27.50/head. Depending upon feed prices and consumption, feeding costs would likely decline by $20-30/head. Therefore, profit could have been reduced by as much as $7.50/head or increased by as much as $20/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 that the higher the carcass price, the more critical 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 and there will be a larger number of yield

grade 4 carcasses and fewer yield grade 1 and 2 carcasses. There also may be some heavy carcasses, and feeding costs will definitely increase. All of these factors need to be considered to determine if profit has increased or decreased.

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 groups of sorted cattle will perform in carcass form. Sorting out "out" or lower quality cattle just before marketing them and mixing them with a pen of cattle sold on an average live-weight or dressed-weight price is a shortsighted approach to marketing. Profit from sorting may be higher for both pens, but over time, packers will likely bid lower for the cash market cattle. In addition, it fails to signal clearly the need to rid the industry of lower quality cattle, resulting in a continued loss of the consumers' food dollar and loss of market share for beef. However, sorting cattle earlier may enable the feeder to manage both pens of cattle to meet specifications in more than one grid. This management change may reduce feeding costs, increase returns, and enhance both short-run and long-run profitability.

Summary and Conclusions

Formula or grid pricing methods have become more common in recent years. Most such formulas have the advantage of pricing each animal, thereby improving pricing accuracy. Cattle are paid on actual dressed weights. Formulas consist of a base price plus premiums and discounts for carcass merit. Better quality cattle are rewarded and poorer quality cattle are penalized. This Extension Facts provided examples of formula and grid pricing, both a general method and one based on plant averages.

Cattle producers need to know the quality of their cattle and how formulas are calculated before knowing whether or not formula or grid pricing will be advantageous for them. Producers also need to consider profit (cost and revenue) implications of attempting to adjust feeding period length to the premiums and discounts in formulas and grids. Formulas and grid pricing have definite advantages. However, cattle producers must understand them thoroughly to take advantage of the benefits and avoid the pitfalls.

References

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